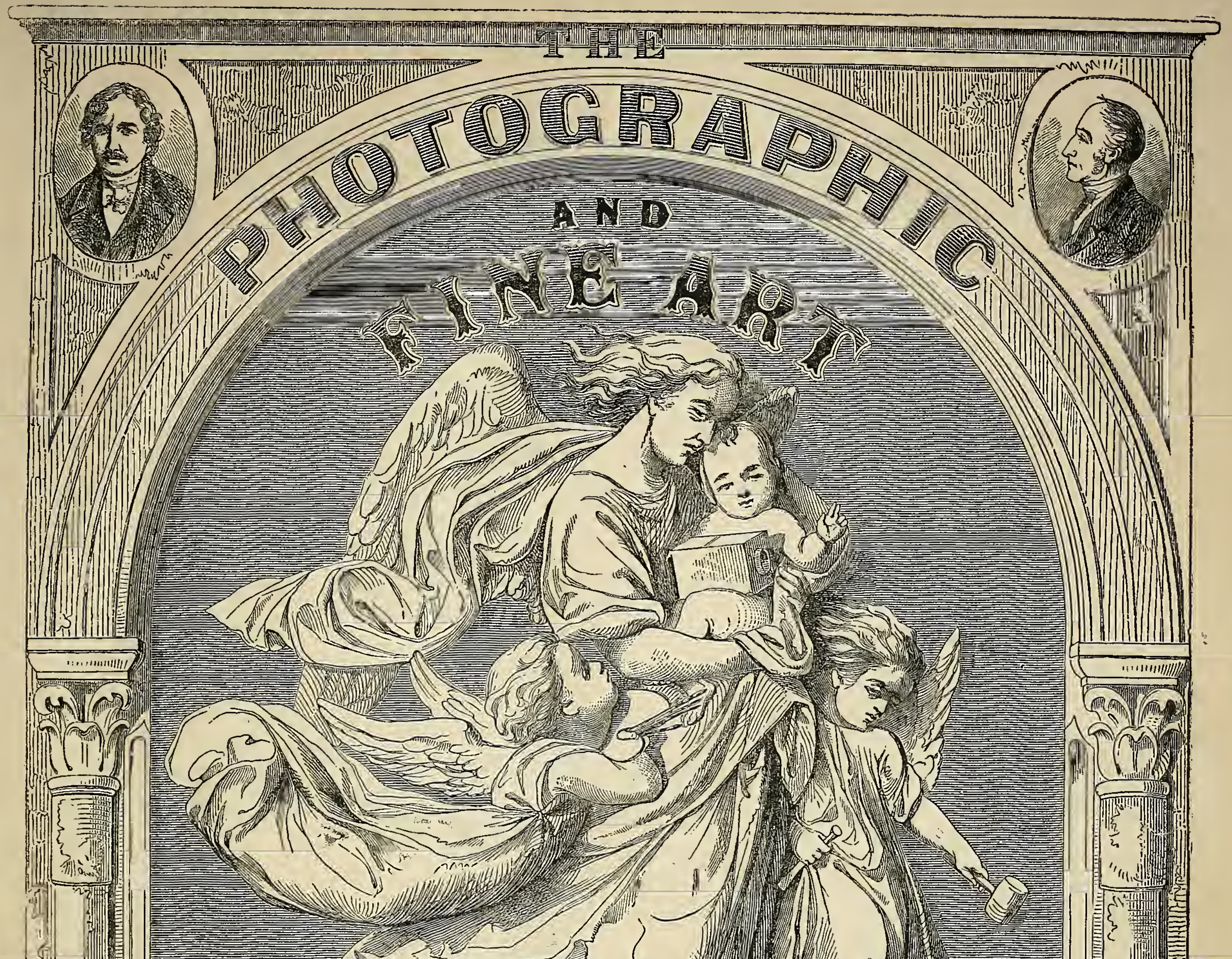
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SUBURBAN RESIDENCE.

(Near Boston, Mass.)

Negative by J. A. Whipple.

THE

PHOTOGRAPHIC AND FINE ART JOURNAL.

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PHOTOGRAPHY—ITS RISE AND PROGRESS.

ARTICLE FOUR.

SIR JOHN HERSCHEL was an earlier researcher into the mysteries of light in its effects upon organic bodies, and to him we owe many of the beautiful results obtained in photography. But like those of Prof. Hunt, nearly all of his inventions are more of a curious and beautiful scientific nature than practical utility; yet they will undoubtedly eventually arrive at some degree of importance. The *Cyanotype*, *Chromatype*, and *Amphitype*, we owe to his researches.—These are all beautiful processes, giving pleasing pictures, but they require some modification, by which they can be accelerated, before they can be used for any other purpose than to wile away the leisure moments of a lover of nature and art.

Among others of the English philosophers who have rendered services to the art to a greater or less extent we may mention the names of Professors Farraday, Mr. Wedgwood, Sir Humphrey Davy, Bayard, Channing and Count Rumford; but the most important practical discoveries, previous to 1850, were made by Messrs. Goddard and Claudet.

The first was that of Mr. Goddard, who in 1840 introduced the vapor of bromine into the daguerrean process. By referring to the original process of Daguerre it will be seen that the vapor of iodine alone was used to coat the silver plate, and that the time required to produce an image occupied several minutes—from ten to twenty—too long to be of any practical use except in taking pictures of still life. The great advantage of Mr. Goddard's discovery will, therefore, be recognized when it is understood that it increased the sensitiveness of the plate to such a degree that portraits could be taken in from one to three minutes. This was first accomplished by Professors Morse and Draper, of New York, U. S., during the same year.

The second was the introduction of chloride by Mr. Claudet. This further reduced the time in the camera, at the same time imparting, in connection with bromine, a finer tone, and giving more decided results, and stronger outline. This discovery was also made in 1840, and since that time the daguerreotype has passed through various modifications, slight in themselves, but important in result, until it has attained its present state of perfection.

We must here again depart from the plan we laid down at the commencement of this History of the Art, to notice the last greatest improvement, and the only one which has served to fix indellibly the daguerrean image on the plate. This was the invention, or discovery, of M. Fizeau, of France, and consists in covering the surface of the plate with a thin film of gold. The gold is dissolved in nitro-muriatic acid, to which is added a portion of chlorine for the purpose of bleaching out the lights of the picture, and giving it greater brilliancy. This solution is called *chloride of gold*, and is applied after the ordinary fixing with the hyposulphite of soda. It gives to the picture a solid transparent covering, which, if properly put on, is as imperishable as gold itself, and if the picture becomes accidentally stained, it can by a careful operation be perfectly restored.

Mr. Claudet has made many other improvements in photography, both on plates and paper, and has also invented several useful instruments, for determining the power of the actenic rays of light, the focal distance, and for the adjustment of the camera. In England several scientific instruments also have been invented applicable to photography. These and the names of their inventors we shall give in separate articles hereafter. We will now return to Mr. Fox Talbot and his patents—in this connection we must speak of the application of collodion by Mr. Archer, in order that the whole subject may be before the reader.

The applicability of collodion, as a sensitive film on glass, to photographic purposes was discovered almost simultaneously by Mr. Archer and Mr. Fry in 1849–50, but we believe the priority has been conceded to the first named gentleman.

"Collodion is a peculiar preparation formed by dissolving gun cotton in ether. It is of a very mucilaginous and volatile character, and the ether evaporating leaves a film of the utmost transparency behind."

This substance, prepared after a given receipts, Mr. Archer applied to the well cleaned surface of a plate of glass, either in its pure state, or in combination with an iodide of potassium and silver. The plate was then excited with a preparation of nitrate of silver, submitted to light in the camera, developed by a solution formed of pyro-gallic and glacial acetic acid and distilled water, and then fixed in the usual way with hyposulphite of soda. The greatly increased sensibility given to the plate by this process at once stamped it as the most practical improvement introduced into the art since the discovery of the use of bromine and chloride of iodine, by Messrs. Goddard and Claudet, and was of as great importance to the paper processes, as the latter discoveries were to the daguerreotype.

Mr. Archer, with the liberality so invariably the offspring of a noble mind, freely presented his process to the world, and it was eagerly seized upon by all the practical and amateur photographers of Europe and America. Modifications of the process were soon suggested, all of which we may say were improvements, until the results obtained were of the most exquisite character. Bromides of ammonium and iodides of ammonium were introduced as excitants, and the protonitrate and proto-sulphate of iron adopted as developing agents.

Photographers who were under the bans of the Talbot patent in England and America, rejoiced that a process had been given them that they could work freely without fee, or without price. A new energy sprang up among them, and the art was advanced more during the following two years, than for the ten previous. To add to the general rejoicings Mr. Talbot was induced to relinquish his title to the Calotype process, so far as taking landscapes and views were concerned, but reserving to himself the right of taking portraits for a consideration. This claim it was thought was overcome by the discovery ef Mr. Archer, and that of Dr. Woods, but no sooner did photographers consider themselves secure on this point than they were met by the applications of Mr. Talbot for injunctions to restrain them in its use.

We have, in former papers, presented Mr. Talbot's processes fully. We shall now give that of Mr. Archer, when the reader can compare them and judge whether Mr. Talbot's assertion that the latter "is a mere modification of his method of using glass" be tenable or not. Another point which he claims as identical, is the use of pyrogallic acid in developing, instead of gallic acid. Even if this were so, we have excellent reasons, as we have before said, in the evidence of the Rev. Mr. Reade, to doubt the origin of that discovery being with him, and it is

positively certain that the use of protonitrate or sulphate of iron did not originate with Mr. Talbot.

When we consider the wealth of Mr. Talbot and the nature of his claims, we cannot avoid placing his conduct in strong contrast with that of Mr. Archer, Professor Hunt, Mr. Claudet, and other equally liberal minded men. Bear in mind the claims of Mr. Talbot as given in his specifications, already noted, and in his published description of his process, and then compare them with the following, which has undergone, and is constantly undergoing, various modifications for the better, so far without the slightest adaptation of any of Mr. Talbot's formulæ.

The collodion being prepared is first iodized with a saturated solution of iodide of potassium, to which is added as much nitrate of silver as it will take up. (An addition, in small quantity, of bromide or fluoride of potassium, is recommended.) The glass plate is then thoroughly cleansed, with alcohol or nitric acid and tripoli or rottenstone. The iodized collodion is then spread upon the plate in an even thin film, and suffered to dry partially. In this state it is excited by plunging it into the following bath:

Crystallized nitrate of silver.......30 grs.
Water.......................... 1 oz.

"This is an operation of much nicety, and requires a steady hand and some care. The plate is held firmly in the hand, and plunged at *one motion* in the bath; if any halt is allowed a line will be produced across the plate, however short the stoppage may be. It should remain in the bath about one minute, for the double purpose of saturating the film with iodide of silver, and removing the oily or streaky appearance from its surface; which latter effect would, if allowed to remain, cause an unequal sensibility in the coating, and consequently an unequal development of the image, which nothing can afterwards efface."

"The plate being thus made sensitive is instantly removed from the bath to the camera, and after sufficient exposition it is submitted to the developing solution consisting of

Pyro-gallic acid................3 grains.
Acetic acid.....................1 dr.
Water...........................1 oz.

"This solution is either poured copiously upon the plate; or it is placed in a shallow dish;—or a vertical vessel—and the plate plunged into it, and suffered to remain until the image is fully developed. Mr. Archer also recommended the proto-nitrate and protosulphate as a developer, as follows.

"Make a solution of nitrate of baryta, 40 grains to 1 ounce of water, when dissolved add to it 50 grains of protosulphate of iron in powder; stir the mixture with a rod, and when the sulphate of iron is all dissolved, allow the precipitated sulphate of baryta to subside, when the liquor above becomes clear, it is ready for use. Add to every ounce of this about half a drachm of acetic acid."

"When the picture is well developed it is fixed with solution of hyposulphite of soda, or bromide of potassium plentifully poured on. The picture is then freely washed in pure water, and passed to the final process which Mr. Archer terms the whitening process.

"Prepare a saturated solution of bi-chloride of mercury in muriatic acid. Add one part of this solution to six of water. Pour a small quantity of it over the picture at one corner, and allow it to run freely over the surface of the glass. It will be found to deepen the tones of the picture considerably, and the positive image will almost disappear; presently a peculiar whitening will come over it, and in a short time a beautifully delicate white picture will be brought out.

"The negative character of the drawing will be entirely destroyed, the white positive alone remaining. This picture after being well washed and dried, can be varnished and preserved as a positive; but nevertheless, even after this bleaching, it can be changed into a deep toned negative many shades darker than it was originally by immersing it, after a thorough washing, into a weak solution of hypo-sulphite of soda, or a weak solution of ammonia. The white picture will vanish, and a black negative will be the result."

The greatest analogy between this process and that of Mr. Talbot, for which he obtained a patent, is the use of a transparent film upon glass, and also the use of pyro-gallic acid, he asserting that his patent specifies a "transparent film," and that as collodion is of this nature, its use by another, without his consent, is an infringement of his patent: also that pyro-gallic acid being the product of the same substance as gallic acid, its use is an infringement of that portion of his patent prescribing the latter substance. We deny his right to a patent for the use of glass, on the ground that it was first used by Mr. Wedgwood, and subsequently—but previous to his adaptation—by Sir John Herschel, of England, Mr. Niepce, of France, and M. Whipple, of the United States. We deny his right to a patent for the application of nitrate of silver, because it was first used by Wedgwood, Davy and Daguerre. We deny his right to patent the use of hyposulphite of soda as a fixative, because it was first recommended by Herschel. We deny his right to a patent for photographic pictures produced upon a transparent film spread upon glass or *any other substance*, on the ground that he specifies in his claim "*albumen*" as the medium used; which substance was the simultaneous discovery of M. Niepce, of France, and Mr. J. A. Whipple, of the United States. And finally we deny his right to a patent for gallic acid, on the ground of prior discovery by the Rev. J. B. Reade, as set forth in the following letter recently published:

Stone Vicarage, Aylesbury,
June 24th, 1854.

Dear Sir,—On my return home after some days' absence, I find my attention called to an extract from your affidavit, referring to my use of infusion of galls as a photogenic agent; I feel it due to you to state, without delay, that there is abundant proof of my use of infusion of galls for the purposes mentioned in your specification, and of my publication of it as forming "a very sensitive argentine preparation," two years before your patent was sealed. Ever since the publication of an extract from my letter to Mr. Brayley in "The North British Review," for August, 1847, which, from the tenor of your affidavit I conclude that you never saw, my claim has been fully recognised in several of the popular manuals. The following is a quotation from one published by Willats:—

The *Calotype* or *Talbotype* is, as we have already mentioned, the invention of Mr. Fox Talbot, or is claimed by him." To this the Editor adds the following note:—"So early as April, 1839, the Rev. J. B. Reade made a sensitive paper by using infusion of galls after nitrate of silver; by this process Mr. Reade obtained several drawings of microscopic objects by means of the solar microscope; the drawings were taken *before the paper was dry*. In a communication to Mr. Brayley, Mr. Reade proposed the use of gallate or tannate of silver, and Mr. Brayley, in his lectures in April and May, explained the process, and exhibited the chemical combinations which Mr. Reade proposed to use." (You may perhaps have forgotten that at the meeting of the British Association at Oxford, I had a short conversation with you on your own colored photographs; I introduced myself to you as a relative of your friend and neighbor, Sir John Awdry, and I informed you that I had used infusion of galls for microscopic photographs, and fixed with hyposulphite of soda, before you took out your patent.) The effect of gallic acid or the infusion of galls in developing an invisible image was discovered *accidentally* by me, as I believe it was also by yourself, and it is certain that no one could use this photogenic agent as we have done without discovering one of its chief properties. I may state that I have often been asked to oppose your patent, but I had no wish to meddle with law, or to interfere with the high reputation which your discovery of a process, named after yourself, secured to you, by which "paper could be made so sensitive that it was darkened in five or six seconds, when held close to a wax candle, and gave impressions of leaves by the light of the moon." This, however, was both subsequent to my own use of gallate of silver of which you appear never to have heard, and also essentially dependent

upon it. My nitro-gallate paper, which I used successfully with the solar microscope, the camera, and argand lamp, was far more sensitive than any which preceded it, and I considered the important question of fixation to be set at rest by the use of hyposulphite of soda, which I have no doubt you employ yourself in preference to your own fixer, the bromide of potassium. In fact, by my process, which, as I state, in my letter to Mr. Brayley, was the result of numberless experiments, the important problem was solved, inasmuch as good pictures could be rapidly taken and *permanently fixed*. My principal instrument was the solar microscope, and while you failed, as you state in your first paper at the Royal Society, to obtain even an impression after an hour's exposure, and were disposed to give up this experiment in despair, though you afterwards obtained small pictures in about a quarter of an hour, I had succeeded in producing and developing at one operation of less, and sometimes much less than five minutes' duration the beautiful *solar mezzotints*, as I termed them, varying in size from fifty to one hundred and fifty diameters, which were exhibited in 1839 at the Marquis of Northampton's, and at the London and Walthamstow Institutions, and some in the Spring of that year were even sold at a bazaar in Leeds in support of a charitable fund. The process was explained to my friends in Yorkshire, and I find from a Leeds manuscript that I proposed the nitro-gallate paper "for immediate use and diffused daylight." The ammonio-nitrate process also, which does not seem to have any definite parentage, though I believe included in your second patent of June, 1843, was among the first which I employed, and probably I was the first to suggest it. At all events I may give you as a matter of history the following extract from a letter to my brother in Leeds, dated April 26, 1839:—"Dissolve six grains of nitrate in one drachm of water, and add liquor ammoniæ, which will throw down the brown oxide of silver, but on the addition of a little more, will take it up and form a clear solution. Wash the paper and dry it. Then put one scruple of common salt in half a pint of distilled water. Wash the paper with this mixture, &c." I also proposed to dissolve two grains of gelatine in one ounce of distilled water as an accelerator for the nitrate, as well as to fix with hyposulphite of soda. Had Mr. Brayley's lectures been printed, you would probably have become acquainted with my processes, as well as with those of other photographers, which were explained and illustrated by him. At all events I have never ceased most emphatically to make the claims which in your affidavit you deny to me, and therefore for the sake of furnishing a correct history of the progress of the art, I must be allowed to print this letter, as the only means left to me of meeting the case.

I am sure that the art now so far advanced, and still advancing has our best wishes. Mr. Grove would present to you in my name a copy of my letter to Mr. Hunt,* which was written before I had heard a syllable of your present actions.

Believe me to be,
Dear Sir,
Yours faithfully,
J. B. Reade.

Hy. Fox Talbot, Esq.

These are the main features of Mr. Talbot's claims, and the only ones of practical importance.

Although we thus deny to Mr. Talbot rights which he has assumed, and "*per force*" obtained, we do not wish to deprive him of those he has justly earned. As a philosopher he has always stood high among his contemporaries, and it cannot be denied that he has rendered considerable service to the photographic art. Simultaneously with the experiments of MM. Daguerre and Niepce upon the silver plate, Mr. Talbot experimented with paper, and very soon after the announcement of the daguerreotype he made known his Calotype process, but with the evidence before us we can only pronounce this the accomplishment of what others had successfully attempted. We must also deprecate the avaricious impulse which impels him on in his attempts to cripple the progress of the photographic art in England by insisting upon a renewal of his patents. He has done much, but others have done more. Compare his results in the Calotype with those of Archer, Cundal, Delamotte, Renard, Le Gray, Evrard, and a host of others, who have labored equally hard with himself, and made discoveries far more practical, and the insanity of his proceedings must become apparent. When we come to write the history of the art in the United States, it will be more so, for we expect to show that almost precisely the same results as produced by the calotype were obtained by a young American, several years before.

We have devoted a large space to Mr. Talbot and his claims, because, at this time, they have assumed an importance far superior to any other branch of the art in consequence of his recent application, in England, for a renewal of his patent, and the threatened attempt of the patentees in this country to enforce their claims. We think we have shown conclusively that his patents have been unjustly granted. Our argument has taken the nature of assertion, it may be said, but in each instance data can, if necessary, be given to prove these assertions correct.

Since writing the above we have read a long article, in the (*London*) Art Journal, on this subject, which takes, mainly, the same ground we have. From this article we extract the following, which briefly furnishes some of the data from which our arguments are drawn.

1.—The Production of the Photographic Image.

a. In 1802, Thomas Wedgwood of Etruria in Staffordshire, took pictures on *white paper* and *white leather*† which was covered with nitrate and chloride of silver.

b. At the same date Sir Humphrey Davy obtained pictures of images viewed in the solar microscope.

c. Talbot himself in 1839, published a paper on the use of the chloride of silver, in which however we discover no fact which had not been published by Wedgwood in the Journal of the Royal Institution in 1802, except the use of a strong solution of salt for the purpose of giving permanence to the picture produced. We find no mention of Mr. Wedgwood's invention in Mr. Talbot's paper, although it was published in the Journal of the Royal Institution, of which Mr. Talbot was and is a member, and who was constantly availing himself of the conveniences which the laboratory afforded.

d. Sir John Herschel, and Dr. Ryan in 1839-40, published the photographic uses of *the iodide* and the *bromide of silver*, the advantages arising from the use of organic acids in combination with the salts of silver, and in particular the use "somewhat problematical of gallic acid."

e. The Rev. J. B. Reade, M.A. F.R.S. on March 9, 1839, communicated to Mr. Brayley of the London Institution, a process which he had adopted for obtaining pictures, especially of microscopic objects. Mr. Brayley lectured on the subject, and exhibited to a large audience, the pictures which Mr. Reade had produced. In this process, *infusion of galls* and *tincture of galls* was employed. In 1847, Sir David Brewster registers his opinion that "the first public use of the nut-galls, which is *an essential element* in Mr. Talbot's patented process, is due to Mr. Reade."

2.—Development of a Dormant Image.

a. Niepce, in 1814, speaks of the gradual development of the clouded imagery" by the use of his solvents. In 1820, both he and Daguerre employ the vapors of sulphur and phosphorus, and in 1839, Daguerre publishes the use of mercury vapor to develope the invisible images of the daguerreotype.

b. Sir John Herschel, in 1840, especially speaks of the *development of dormant images on paper* in the chapter of his paper which is devoted to the fixing processes; and again he shows that an invisible image obtained *on paper* spread with a salt of gold, could be rendered visible by a subsequent process.

* Published "Philosophical Magazine," May, 1854.

† The peculiar sensibility of *white leather*, noticed by Mr. Wedgwood, was no doubt due to the tannin present, tannic and gallic acid acting equally well as developing agents.

3.—Fixing Agents.

a. Sir John Herschel discovered the hyposulphnrons acid, and that the salts of this acid—hyposulphites—possessed the property of dissolving the chloride of silver: and he particnlarly in 1840, recommends the use of *hot hyposulphite of soda* for the removal of iodide of silver from the papers on which it has been employed.

b. Mr. Reade also used in his processes hyposulphite of soda. Daguerre employed it as his fixing agent, and it was commonly used by Hunt and others in 1840.

We are now in a position to examine the claims of Mr. Tal bot as set forth in his earlier specifications. These are :—

1.—Iodized Paper.—This was used by several persons previously to the date of the first patent, and several times published and sold.

2.—Gallic Acid, and the *development of a dormant image.* We have seen that neither one nor the other originated with the patentee.

3.—Hyposulphite of Soda.—Used and described both cold and hot, by Reade, Herschel, Daguerre, and Hunt.

"We have carefully given the dates of publication in each case; and it is quite evident that there is no one poiut of importance in the calotype process, which has originated with the patentee.

"Reviewing Mr. Fox Talbot's labours as an experimentalist, we find him industriously working upon the ground which others have opened up. He has never originated any branch of inquiry; and, in prosecuting any, his practice is purely empiracal. It is the system of putting this and that together to see what it will make. It is progress by a system of accidents, without a rule. Thus it is, that we find the calotype process was the result of an accident; and, in no respect has even the combination of which it consists the slightest claims to a scientific deduction. Herschel had employed iodide of silver, and used organic acids,—amongst others the gallic acid. Reade had used infusion of galls; consequently Mr. Talbot, in the quiet of his ancestral home, repeats and re-repeats these expriments. That which Herschel said was problematical, Talbot could not make anything of, and his prepared papers were rejected as failures. Eventually, either his servant or himself, found that pictures were developed in the dark on the hitherto blank sheets; and hence the invention of the calotype, which is now made the subject of such unpleasant legal proceedings. If Mr. H. Fox Talbot, however, insisted on claiming his calotype process only under his patents, we should not have felt called upon to make these remarks.

We shall devote our next paper to the improvements and discoveries made in France.

ON A PHOTOGRAPHIC METHOD FOR DETERMINING THE HEIGHTH OF THE CLOUDS.

BY M. POUILETT, MEMBER OF THE ACADEMY OF SCIENCES.

In a communication made by me about 15 years since to the Academy (Comptes Rendus, vol 1, p. 717, A.D. 1840) will be found an historical sketch of the different methods which have been invented to determine the height of the clouds. All these methods, those of Bernoulli, Lambert and Arago for instance, repose on the principle of *isolated observations*, that is to say, observations made by a single observers at one point only. After having examined this principle by itself, and in the results which it had as yet produced, I was led to this conclusion ; that it might solve the question in a few particular and in some sort exceptional cases, but that it was still incapable of solving the general question of the distribution of the clouds in the different regions of the atmosphere.

I consequently proposed a new method depending on the principle of *simultaneous observations*; that is to say, observations made simultaneously by two observers at the extremities of a base line of known length. Several experiments which I have been able to make on this principle, leave no doubt in my mind of the advantages which may be derived therefrom, provided always that we consent to the ontlay necessary to apply it under the most favorable circumstances.

Since this period fresh attempts have been made to return to the isolated observation principle ; Mr. Wartmann proposed a method which appears to me to possess but little applicability. (Annales de chimie et de Physique 3rd Series Vol. XXIV, p. 208,1848) ; Our confrere, Mr, Bravais at the same period proposed another which he has at least submitted to several experiments (Annales de chimie et de Physique 3d series,Vol. XXIV p. 497,1848),but even this appears to me to be restrained within too narrow limits.

These new experiments have not in the least changed my old conviction of the necessity of having recourse to simultaneous observations. Different circumstances having led my attention to this subject, I took it up at various times, at some for the purpose of assuring myself of the simultaneous action of the two observers, at others to simplify the establishment of rapid means of transportation, and thereby render them less embarrassing and especially less expensive. Lastly, the solution of the problem which always appeared to me to present many difficulties of this kind, I have sought in the discoveries of *photography*, and shall explain in a few words how experiments may be made by this new method, and how two photographic apparatus may with incontestable advantage be substituted for the two observers required by this system. Photographic object-glasses may embrace a field of about 28 degrees and at the same time give an evidently plane view of all objects as a whole disposed on a plan perpendicular to the axis.

Thus, by considering the optical centre of such an object glass as the apex of a double cone whose apothem* forms with its axis an angle of 14 degrees, it follows that each perpendicular section into which this cone may be conceived to be divided situated at a certain distance forward, will give its image in a corresponding section behind ; the distances, moreover, from the optical centre to each of those two sections are united together by the general formula of the lenses.

$$\frac{1}{b} = \frac{1}{f} - \frac{1}{m}$$

f, principal focal distance of the lenses ;
b, distance of the section in which the object is found :
m, distance of the section in which the image is found.

In Photography the values to be given to f depend on numerous elements, and especially on the intensity of the light which is necessary to produce the desired effect on the sensitive coating. In the question before us, the value of f may vary from 50 to 70 centimetres ; we take as a mean 60 centimetres.

With this datum it is easy to perceive that the object being placed at 600 metres or 1000 times the principal focal distance, the image should be produced at a distance of $m = 0{\cdot}600$ metres ; that is to say at only 6+10 of a millimetre farther than the focal distance itself. All objects therefore at upwards of 600 metres will produce their images very plainly on the same plane at the distance of 60 centimetres behind the lens.

A picture which is to embrace the entire field should therefore be a circle of 30 centimetres diameter, as in a cone of 28 degrees aperture, the diameter of a section perpendicular to the axis is half its distance to the apex.

In like manner, the absolute diameter of the field is half the distance b the place of the object; thus, for instance, for an object at 2000 metres, the real diameter of the circle forming the field, would be 1000 metres.

This granted, let us suppose two equal photographic apparatuses, the axes of their lenses having a vertical adjustment and placed 100 metres from each other. The cones which bound the respective fields, the outer lines of which are at first separate, at

* According to Legendre, a cone is conceived to be *generated* by the revolution of a right angled triangle, the perpendicular side of which is stationary and the outer side or hypothenuse (in French la *generatrice* or generator. and in English the apothem) is moveable.—*Translator.*

a certain height commence to penetrate each other ; this happens when the radius of the field is equal to half the distauce which separates the apparatuses, consequently when we have retained a vertical height of double this distance or 200 metres—double the distance we took as an example—then the two cones gradually penetrating each other, the space which they embrace in one and the same horizontal plane becomes what may be called the *common field*, since it belongs to both apparatuses.

The circles, which by cutting each other determine the common field, have for radius one quarter the height h to which we have ascended; the line which joins their centres always remains equal to the apparent horizontal line which joins the optical centres and which measures the distance (d) of the two stations, as also to the equal and parallel line which joins the centres of the two pictures; the latter may be called the *fiducial line* as it serves to mark the images. From this it is easy to see that in the directiou of the fiducial-line the absolute size of the field is expressed by $\frac{h}{2} - d$, which in a perpendicular direction is expressed by $\frac{1}{2}\sqrt{h^2 \; 4d^2}$. As it is necessary besides that the proportion of h to d be comprised within certaiu limits we may make $h = cd$, the direction of the commou field then become

$\frac{d}{2}$ (c —2) in the direction of the fiducial line.

$\frac{d}{2} \sqrt{(c - 2)(c + 2)}$ in the perpendicular direction to this line

and it will be perceived that for the design iu view it will be as well to fix it so that c shall not be less than 10 nor more than 30.

Now, suppose that throughout the whole extent of the field the sky is clear, with the exception of a single small cloud of any form whatever, the outliue of which is very sharp and moving in any directiou with the fiducial-liue, it is evident that the exact image of such a cloud will be produced simultaneously in the pictures of the two apparatuses, that it will be perfectly recognizable there, that in the picture it will occupy a place determined by the height and the position of the cloud in the sky, that it will have a parallel movement, and that, could it be impressed at the same instant in both pictures, it would be possible from the appearance of these impressions and the place which they occupy, to reconstitute the form of the cloud in the bosom of the atmosphere and to determine the height at which it is situated above the optical centre of the two apparatuses.

Photography, and photography alone, can realize the suppositiou we have just made ; it can strike off the impressions suitable for giving the height of the cloud, and more especially, it can act at the same iustant in the two apparatuses, accomplishing this action in a space of time so short that the cloud cannot escape by the swiftness of its motion.

Let us suppose that the square glasses designed to receive the images carry two lines perpendicular to each other, and let the intersection be taken as the centre of the glass or picture ; let us suppose that the position of each glass in respect to its object-glass be obtained once for all so, that the optical axis passes perfectly through its centre, and that at the same time oue of the perpendiculars is found iu the direction of the fiducial line (ligne de foi.) The image being then received aud fixed, we may by the following method deduce the height of the clouds which they represent.

It is easy to be seen that for everything appertaining to the common field the images are equal, and to superpose them it will be necessary.

1st. To put the fiducial-line into coincidence;

2d. To slide in the direction of this line, one of the centres in reference to the other, a certain quantity, p, which we shall call the *displacement*.

Let us designate by Z_1 aud Z_2 the poiuts when the optical axis of the first and second apparatus penetrate the common field where the cloud is found, by Z_3, a third point, laid arbitrarily in the same plane and in the common field likewise ; suppose we draw lines through the optical centre of the first apparatus to these three points, and that we extend them downwards to the plane of the picture, two similar pyramids will thus be fonnd opposite at the apex.

The same construction in the second apparatus will lead to the same result.

The two large pyramids, moreover, having the same base, the two small pyramids will have equal bases, under the single condition that the first and second object-glass have the same principal focal distance, as we have supposed; therefore, the two images, in this case, are not only equal in the ensemble of the field, but they are equal on each side of the fiducial line.

The two pyramids relative to the same apparatus give the proportion.

$$h : f : : Z^1 Z_2 : p \,;$$

the line $Z^1 Z_2$ is eqnal to the distance d of the optical centres of the two object-glasses ; p is the image of $Z_1 Z_2$; its value consequently, shows precisely how much it would be necessary to slide the centre of the first image in the direction of the fiducial line, in reference to the centre of the second, in order to arrive at the coincidence of the images from the three points Z_1 Z_2 Z_3, or in a general way, at the coincidence of the images marked upon the pictures, at least as to all the portion of the field which belongs to this plane. Therefrom results :

$$h = d f$$

The whole question is then reduced to finding the value of p, as f and d are known.

Let us take the centre of each glass as the beginning of the coördinate, and the fiducial line as the line of the abscissæ ; the positive part for instance being on the left when the glasses are in place and ready to receive the action of the light ; if these prove what we have jnst said, a point (A_I) be marked upon the first image, and on the second its *homolagous point* A^{II}, so that A^I and A^{II} be the two images of the cloud, from any A^I point whatever, the ordinates of A_I and A^{II} will be equal, and the abscissæ different ; this difference, moreover, of the abscissæ will be the precise value of the displacement p.

We may then proceed in the following manner : The two glasses bearing the images may be arranged upon a horizoutal frame side by side, in exact contiuuation of the fiducial line turned as they were when the images were produced. Illuminated beneath by reflected light, we will, ou examining their upper surface by transparency, perceive the images in all their purity, we may make minute comparisou and recognize all the amologous points belonging to the common field. A divided rule resting on the edges of the frame may slide from one extremity to the other of the two glasses, keeping parallel with itself and perpendicular with the fiducial lines, au ocnlar lens furnished with crossed threads and moveable along the rule, may itself be kept perpindicular to the plane of the images, and may pass through their whole extent. We may thus be enabled to recognize successively all the homologous points and to measure with great precision the differences of their abscissæ, that is to say the value of p or the displacement appertaining to them. These values being substituted in the formnla, will give the corresponding heights.

If it happen that the focal distances of the object-glasses were somewat differeut, the two images, instead of being equal, wonld only be alike on either side of the fiducial line; but we could recoguize the homolageous points A^I and A^{II} images of the same A, and deduce therefrom by another proportion the height of the corresponding cloud. It will always be more precise, however, to work with like object-glasses.

Let us now examine the reqnirements to be fulfilled in order to deduce from the formula the values of h with snfficient approximation.

1st. We may admit that the values of h should be nearly comprised between 1000 and 15000 metres.

2d. We may admit that the photographic apparatuses should be adjusted with sufficient precision to ensure of there being nothing but very slight errors in the vertical direction of the optical axis in the marking of the centre of the glasses, and in the exact setting of the fiducial line. The principal errors therefor will bear on the uncertainty with which we may be able to recognize the homolagous points and determine the difference of their abscissæ. It is therefore necessary that the absolute value of p be not less thau 20 millimetere in order that the error of

about $\frac{1}{5}$ millimetre which we may commit in its determination may be but the one hundredth part.

3d. The values which we have previously found for the size of the common field shows that its smallest dimension is in the direction of the fiducial line. Now, it is of the highest importance that this smaller dimension be sufficiently large to be seen under an angle of 20 to 25 degrees in order that the observer viewing it and directing the experiment, may the better understand the boundaries of the common field and the space of time which the clouds require either to reach it or traverse it.

It results from these considerations, that the value of d which will agree with the inferior regions of the atmosphere, can in no wise agree with the upper ; we are therefore led to separate into numerous strata, and to dispose the two apparatuses at different distances according to the greater or less heights towards which we wish to direct the operations. We might, for instance, separate the clouds into three strata in the following manner :—

The first or lower stratum extending from 1000 to 3000 metres.

The second or mean stratum extending from 3000 to 9000 metres.

The third or upper stratum extending from 9000 to 15,000 metres. The corresponding distances then of the two apparatus, would be

Of 1000 metres to work the lower stratum.
Of 3000 " " mean "
Of 6000 " " upper "

By means of these dispositions, the principal focal distance being of 60 centimetres the values of p would be comprehended between 60 and 20 millimetres for the two first cases, and between 40 and 24 for the third. Thus, under the most unfavorable circumstances, the height of the clouds would yet be given at less than $\frac{1}{100}$ of its value, admitting always that the errors in observation do not go beyond the probable limits which I have mentioned farther above.

For the consideration of the sharpness of the images and the rapidity with which they may be obtained, I had recourse to one of our most skilful photographers, M. Bertsch, who was among the first in the invention of those processes by means of which we obtain in less than a second of time portraits which leave nought to be desired. M. Bertsch was very willing to furnish me with several impressions of a cloudy sky, employing his own method and apparatus, in a very short space of time, extending to scarcely a quarter of a second, he obtained negatives in which all the peculiarities were represented with perfect truthfulness. These experiments seemed to me decisive ; they demonstrate that from the present time, we may at last demand from photography the resolution of all the principal questions relating to the form, the distribution and the height of the clouds.

The experiments may be disposed in the following manner : The two apparatuses are placed at a distance deemed most proper from the aspect of the clouds ; each has his camera and near him a fixed or portable tent or cabin for the manipulations ; as they should be performed rather rapidly by the processess called instantaneous. Towards the middle of the line which separates the apparatuses rises a vertical pole furnished with cross staffs ; an observer then takes account of the boundaries of the common field and of the moment when the clouds which he is to observe have taken a good position in reference thereto ; a few moments previous to this he gives a signal to the operators to prepare their glasses. This done, he chooses a favorable moment and by one turn of the crank he at once opens and closes the two apparatuses ; the light has produced its effect, the glasses have received their impress, the images are obtained ; all that remains is to fix them by the ordinary methods. Lastly, they may be taken out and leisurely studied in the comparison frame.

All the preceding refer to observations which should be taken only in the neighborhood of the zenith ; if we desire to extend them to every part of the heavens, the apparatus would become more complicated on account of experiments which it would be necessary to go through with to assure and verify the parallelism of the optical axes.

From Notes & Queries.

PHOTOGRAPHIC NOTES.

SINGLE STEREOSCOPIC PICTURES.

My short comment upon this subject (vol. viii. p. 354,) having induced some farther remarks from Mr. Thos. Rose and Mr. Ingleby, which appear to call for additional explanation from me, I beg to offer the following. The photograph as proposed to be taken by Mr. Norman is produced *virtually* by two lenses having their foci coincident, or, what is the same thing, by making use of two parts of one lens by means of two small apertures near the circumference, the apertures being $2\frac{1}{2}$ inches apart. The consequence of this arrangement is, that objects in the same plane in the principal anterior focus of the lens would be depicted sharply and clearly, while those in planes more remote would present a somewhat obscured outline, owing to their being depicted from a different point of view by the two lenses; the *bearings* (to use a nautical phrase) of the proximate and distant objects varying from one another, according to the spot whence observed; hence the impression upon the mind, when a picture resulting from Mr. Norman's arrangement is viewed by means of one eye, is very similar to that produced by viewing solid objects with both eyes. The distance between the points of view being smaller than Mr. Rose considers useful, is only a question of degree, not of fact. Mr. Rose has attributed to me observations regarding increased intensity, which should have been applied elsewhere.

My observation that *all parts of a single picture are equally distant from the observer*, is of course only *approximately true*, the same applies to the usual two pictures; but in one case this fact would be discoverable in consequence of the uniform convergence of the axes of both eyes, if brought to bear upon all parts of the picture, whereas with two pictures this is not the case, each eye being confined to its own picture alone.

Geo. Shadbolt

I am pleased to find that my communication has caused some discussion from several gentlemen, who have not thought it necessary to adopt language tending to throw ridicule over the matter.

In one point I beg, however, to suggest to Mr. Rose that he is not quite correct, when he states that no stereoscopic effect can be produced at such a small angle, but only an intense picture formed by the superposition of two pictures exactly alike.

Now it appears to me that if the two diaphragms be $2\frac{1}{2}$ inches apart, surely the two pictures must differ to the same extent as the two pictures produced on the retinæ of the eyes (the same distance apart.)

I mentioned in my first communication that such an angle was far too small to produce the ordinary exaggerated stereoscopic effect; but that a pair of lenses placed some distance apart (but still superimposing the two pictures on the screen) would in all probability produce everything to be desired.

I shall be glad to learn that some gentleman, having the necessary time and means at his disposal, will try the experiment fairly, and give the result, which, if I mistake not will be important.

George Norman.

THE STEREOSCOPE QUESTION.

I observe, in your recent Numbers, a dispute on the theory of the stereoscope, in which Mr. Norman, Mr. Ingleby, Mr. Rose and Mr. Shadbolt have taken a part. As there cannot be two opinions on a question of pure science, it is not difficult to settle the points at issue between these gentlemen

Mr. Norman is mistaken in supposing that the photographs taken by his altered camera have a stereoscopic effect different from that produced by every other photograph. He is correct, however, in stating that the photographs produced by his altered camera have, when seen with one eye, a good stereoscopic effect.

The writer of this Note published and explained this fact long ago, and has shown it to many persons. The effect is finely seen in a large photograph of a bust, or of a street much foreshortened. In these the stereoscopic effect is perfect.

The imperfect stereoscopic effect of the best executed portrait, or building, or landscape, upon a plain surface, when seen by *both* eyes, is that we learn, from the slight change in the convergency of the optic axis while surveying the picture; that all the parts of it are nearly equidistant from the eye, and are therefore painted upon a plain surface. Whereas, when we view the same object with one eye, we lose the power of estimating distance given us by binocular vision; so that the lights and shadows, and the ærial or geometrical perspective, are allowed to produce their full effect. Mr. Shadbolt has stated this more briefly, but correctly.

The eye may, by a little practice, be taught to see a perfect stereoscopic picture by simple vision; but the effect is instantaneously produced when both eyes are good, and equally so either by squinting or by a stereoscope. The true theory of the stereoscope was first given by Sir David Brewster, in the *Transactions of the Royal Society of Edinburgh*, some years ago: and his paper was, we believe, reprinted in the *Philosophical Magazine.* Persons unacquainted with the true theory of binocular vision, upon which the theory of the stereoscope is founded, are attempting to produce stereoscopic effects by the union, upon a plane surface, of the two dissimilar images of solids; but they may rest assured that the attempt will be fruitless. M. N.

MORTUARY PHOTOGRAPHS.

A plodding reader of "N. & Q." from the first number to the last, and an occasional contributor, I have never been able to perceive the congruity of the photographic department of *our* periodical, nor can I cease to wonder at its continuance. I say this as a most enthusiastic admirer of the art itself, which I submit is based upon the most remarkable discovery of the age, the claims of the electric telegraph notwithstanding. And here am I writing a photographic Note, the insertion of which in the repudiated section would be a fit punishment for my temerity. My object, however, is simply this: to direct the atention of those "whom it may concern" to one use of the photogenic science, which is perhaps not generally known—I mean the copying of mortuary memorials. What is done, or what might be done *inside* a church, I do not know; but I have lately seen two or three specimens of head-stones represented with so much truth and beauty, that I cannot but think this method of copying and transmitting to a distance, such memorials, only requires to be generally known to be largely employed. In the cases referred to, the single grave-stone came out so clearly, the lettering was so sharp, and the accessories so pleasing, and I might say, picturesque, that none of the fine engravings on the walls where these mortuary photographs were hanging, surpassed them in pleasing effect. X.

POSITIVE PRINTING.

As several facts of some interest upon this subject have presented themselves to me somewhat prominently, during a rather extensive series of experiments, I beg to offer a few observations, in the hope that they may be of use to some of my photographic *confreres.* I do not find that proofs produced by *development* of a latent impression are one whit more stable than those printed by the ordinary chloride process, provided they have both been submited to a colouring bath, and without it both are of little or no value. With proper precautions, I believe that both are perfectly stable. The more a proof is kept to the *surface of the paper*, the more brilliant is the result, while saturating the paper with the salting solution tends to produce a deadness and flatness of effect extremely unpleasent; hence the superior brilliancy of albumenized proofs. The gloss produced by albumen is a drawback to its use in many casses, but the advantages in other respects compel us to submit to this defect generally. I believe, however, that a substitute may be found in gum tragacanth (gum dragon), which will give the necessary *body* without the gloss.

The almost total removal of the free nitrate of silver, by washing the proof *before coloring*, as recommended by Mr. Sutton, is a feature of such importance, that it cannot be too strongly insisted upon, and the bath of sel d'or for colouring, also suggested by that gentleman, is so infinitely superior to all other methods, as to insure its universal adoption. Moreover, by its use we are enable entirely to dispense with the abomination of *over-printing*, and I have also discovered that, *after this bath*, we can send hyposulphite of soda to the "right about" as a fixing agent, and use instead liquid ammonia, thus removing the source of over-sulphurization, and at the same time the principal one, of the loss of some good pictures. Bromide and chloride of silver are both soluble in ammonia, but the iodine is not, hence it is necessary to exclude iodine and its compounds from the preparation of any paper to be fixed by ammonia. This material has been before suggested for removing the chloride of silver but, *without the gold bath first applied*, it unfortunately removes the picture itself with it.

When ammonia is used as a fixing agent, it should not be exposed to ordinary daylight at the time of operating, as the chloride of silver when disolved in this menstruum, is exceeding susceptible of the actinic influence.

I abstain for the present from giving formulæ, as the principles are capable of application to almost any mode of proceeding, but shall be happy to furnish them if desired.

Geo. Shadbolt.

SINGLE STEREOSCOPIC PICTURES.

Having been allowed to express my opinions in "N. & Q." on the subject of stereoscopic angles, perhaps I may be permitted to offer a few words on the subject of Mr. Norman's mode of taking single stereoscopic pictures by one lens; and am induced to make this request, because, as far as I am capable of thinking, those who have mooted the question in "N. & Q." have left it unsetled. I consider that Mr. Norman's method (ingenious as it undoubtedly is) is optically incorrect; and am at a loss to understand how two incorrect pictures, blended in one, can result in a picture which, when seen by one eye, can be "wonderfully," or even satisfactorily, stereoscopic. If I rightly comprehend the method proposed by Mr. Norman, it is this: there are two apertures, $2\frac{1}{2}$ inches apart, in a piece of wood or other material, placed before one lens, through which the pictures are received and blended in one, which is the picture taken. This picture, I have said, is optically incorrect; and, I believe, the following experiment will show that it must be so. Let there be a row of six columns, at 12 feet apart, numbered 1, 2, 3, &c., begining at the left hand. Now, the light from these columns, in its passage through the lens: will be more and more refracted as it approaches the outsides of the lens: consequently, in the picture produced by the aperture on the left side, the columns 1 and 2 will be *nearer* together than 5 and 6; whilst in that at the right 1 and 2 will be *wider* apart than 5 and 6, so that two pictures, incorrect throughout their whole range, will be blended together in one.

That such must be the case, any one who understands the nature of a lens, and who can draw a very simple diagram, can satisfy himself.

This being the true state of the case, I am at a loss to understand how such a jumble (for such it is) can produce, when seen with either one or both eyes, stereoscopic effect—or, I would rather say, satisfactory stereoscopic effect.

If the passage of light through a lens be considered, it will be evident that no *single* lens can produce two correct pictures; and that, therefore, Mr. Norman's method must, as an optical necessity, fail. It is also equally clear that two correct lenses, $2\frac{1}{2}$ inches apart, must be used, if two correct pictures are to result. But, whether such pictures could be superposed, is a question, the answer to which, I should incline to believe, must be no. Then there remains another question (and a most interesting one it is), would the two correct pictures so blended produce due stereoscopic effect?

T. L. Merritt.

PREPARATION OF GUN COTTON FOR COLLODION.

M. Delahaye has communicated to the 'Société Française de Photographie' a method he employs for obtaining invariably gun cotton for collodion which is perfectly soluble. He immerses the cotton, immediately on its being removed from the mixture of nitrate of potash and sulphuric acid, in monohydrated nitric acid of 48 degrees. The immersion must be as complete as rapid; as the cotton cannot remain in the nitric acid without undergoing some modification, it must be instantly removed and thrown into the washing trough. In this operation M. Delahaye prefers distilled water, in order to avoid the saline substances contained in ordinary water, which always interfere with the collodion.

M. Delahaye bases his process upon this principle, that it is impossible, on a large scale, to make a gun cotton which shall be perfectly soluble, by immersing the cotton in the usual manner, as the whole of it cannot fix such an amount of nitric acid as to form the compound C 24 H 17 O 17, 5 N O_5, the formula necessary to give a perfect collodion.

MORTUARY PHOTOGRAPHS.

Perhaps the use of photography in its application to the copying of mortuary memorials is more "generally known" than X. believes it to be. I have met with many specimens similar to those of which he speaks. But, I would here particularise the very interesting calotypes of that corner of Grasmere Churchyard, in which is a blue headstone, inscribed "Willam Wordsworth," and surrounded by gravestones, on which are the names of Dora Quilliman, and other members of the poet's family, together with the gravestone of Hartley Coleridge. This family group of gravestones makes a very pleasing photograph, and—so says the bookseller of Ambleside—a very *saleable* one. I bought one there, for half-a-crown, in the autumn of last year.

CUTHBERT BEDE, B. A.

SINGLE STEREOSTOPIC PICTURES.

As you have allowed MR. MERRIT to re-open the discussions on the subject of the possibility of single stereoscopic picture, you will perhaps allow me to make a rejoinder to MR. SHADBOLT. At p. 333. of the present Volumn, I asked that distinguished photographer what he meant by stating that in a single picture "all the parts are equally distant from the observer." I did so—First, Because "the observer," is not a mathematical point. Secondly, Because there exists no point from which all the parts of a plain surface are equally distant. He explained his meaning at p. 351., where he allows that the remark above quoted "is of course only approximately true." The statement, nevertheless, is always untrue, whatever point the distance is taken from. He adds, "the same [remark] applies to the usual two pictures; but in the one case the fact would be discernible in consequence of the uniform convergence of the axes of both eyes, if brought to bear upon all parts of the picture, whereas with two pictures this is not the case, " &c I reply, every tyro in optics knows that a uniform convergence is impossible in either case: the only surface that admits of such uniformity is a sphere whose radius $=\frac{1}{2}$ distance between centres of the eyeball $\times$ coseant of angle of incliuation of the optic axes.

MR SHDBOLT's last remark, then, is no more true than the first was. I must beg MR. SHABOLT not to fall into the mistake of MR. GEORGE NORMAN, and suppose that I write for the sake or indulging satire. My respect for either correspondent, however, shall not prevent my saying that no good can come of these discussions if inaccuracy and ambiguity are to be the weapons of the disputants.

C. MANSFIELD INGLEBY.

EDUCATION is a better safeguard of liberty than a standing army. If we retrench the wages of the schoolmaster, we must raise those of the recruting sergeant.

From the Journal of the Photographic Society.

ON RENDERING THE COLLODION FILM PERMANENT INDEPENDENTLY OF GLASS PLATES.

To the Editor of the Photographic Journal:

SIR,—Ever since my introduction of the collodion process, it has been my desire to do away with the inconveuience of glass for negatives.

According to my early publications, when on a journey, I used to remove the collodiou film from the glass, roll the pictnres up between blotting-paper, and expand them again on glass when at home; but this occupied much time, and required very delicate manipulation.

These difficulties induced me to try experiments with a variety of substances likely to preserve the delicacy of the picture on the collodion film, and to be sufficiently strong to bear handling when in use.

After much labor I have succeeded in my object, and in August last I patented my process, which I hope will be found to remove the only great impediment to the universal use of collodion in photography; for the weight, breakage, and other accidents attending glass negatives, must have proved great annoyances to the most ardent admirers of the collodion process.

I should have introduced this improvement at an earlier date, but I was anxious to test its utility during the hottest days of summer, as well as at other seasons, and I found it perfectly successful. The material used is a solution of gutta percha in benzole. Other solvents can be used ,but this is preferable to any.

There are two methods of applying this solution of gutta percha (both included in the patent) to accomplish the object in view, viz. the removal of the collodion film from the glass: I will describe them in detail.

The first method is this:—Pour on the clean glass plate a quanity of the solution of gutta percha in a similar manner as for coating the glass with a film of collodion. When this film is dried, the iodized collodion is poured on and immersed in the silver bath. The plate is exposed developed, and fixed. The glass plate with gutta percha and collodion film attached to it, is immersed in a vessel of cold water, which presently causes the two combined films to seperate readily from the glass.

The second method: prepare the glass with iodized collodion, and proceed with the process in the ordinary manner.

When the collodion picture is dried, pour on to it the solution of gutta percha; when the plate is covered, hold it in a horizontal position for about a minute to thicken. Draw off very gently through a funnel into the bottle the excess of solution, and gradually raise the plate vertically over the funnel.

The benzole will evaporate rapidly, leaving on the collodion picture, and in intimate contact with it, a coating of gutta percha.

The plate must now be gently held with its back towards a clear fire, to accelerate the hardening of the gutta percha and to prevent its chilling on the surface.

When cold, the plate is immersed in a vessel of cold, water, which causes the combined films to seperate, in one sheet, from the glass.

In this operation the benzole solution does not come in contact with the glass, nor is the surface of the glass in any way injured by its application to the collodion.

Thus the glass can be used again after the ordinary cleaning.

One great objection to the first method is, if the collodion picture be not successful, the gutta percha coating is lost ; whereas, in the second, the solution is only applied to a perfect picture, or such as the operator wishes to preserve.

Another objection to the first method is, the great difficulty in getting the gutta percha film sufficiently even when used thick enough to support the film.

I hope, at a future opportunity, to lay before the Photographic Society a more detailed account of this process.

I am, Sir,

Yours faithfully,

FREDERICK SCOTT ARCHER.

A MANUAL OF PHOTOGRAPHIC CHEMISTRY,*

Including the Practice of the Collodion Process.

BY T. FREDERICK HARDWICH.

CHAPTER VI.—CONTINUED.

In a later number of the Journal some judicious remarks have been made by Dr. Mansell on the manipulation of syruped Collodion plates. He finds that when they have been long kept a layer of indurated syrup forms upon the surface of the film which cannot be removed by washing in cold water. It is soluble in hot water, but the most simple plan of removing it appears to be by *steaming*.

On taking the plate from the dark slide it is first washed in cold water, and then held collodion-side downwards over the steam of boiling water until the hardened syrup is seen to dissolve; it is then again washed, with distilled water, and treated with the mixture of Pyrogallic Acid and Nitrate of Silver as before.

Mr. Maxwell Lyte, who has employed Honey in Photographic processes from an early date, uses it in a manner somewhat different from that described. His object is to obtain a moderate amount of keeping qualities (say one hour in the hottest weather, or several hours in cool weather) without lessening the sensitiveness of the plate. He does not therefore wash the film in water, but on its removal from the bath treats it at once with the diluted honey, previously mixed with Nitrate of Silver.

The proportions are, Honey, old and crystallized, 6 ounces; distilled water, 6 ounces; Nitrate of Silver (completely neutral) 300 grains; Alcohol, 8 drachms. The mixture is to be exposed to the light (not sun) until it becomes very brown, and then filtered through animal charcoal to decolorize it.†

The subsequent washing and developing may be conducted in the same manner as described by Mr. Shadbolt.

CHAPTER VII.

ON STEREOSCOPIC PHOTOGRAPHS, AND MICRO-PHOTOGRAPHY.

SECTION I.

On Stereoscopic Photographs.

On object is said to be "Stereoscopic" when it appears to stand out in relief and gives to the eye the impression of solidity.

This subject was first explained by Professor Wheatstone in a memoir "On Binocular Vision," published in the 'Philosophical Transactions' for 1838. He has shown that it is by the joint use of *both eyes* that we appreciate the rotundity, depth, or thickness of the objects which surround us.—

If a solid cube, or a small box of an oblong form, be placed at a short distance in front of the observer, and viewed attentively with the right and left eye separately, and in succession, —it will be found that the impression received in the two cases is different; that each eye sees more of that side of the box which is opposite to it, and less of the other side; in neither instance is the effect exactly the same as that given by the two eyes used conjointly.

This fact may also be illustrated by the following diagrams, which show the appearance of a bust seen by each eye successively.

Observe that the second figure, which represents the impression received by the right eye, is more of a full face than fig. 1; which having been viewed from a point removed a little to the left, partakes somewhat of the character of a profile.

The human eyes are placed at least $2\frac{1}{2}$ inches, or from that to $2\frac{5}{8}$ inches asunder; hence it follows in all cases that, the point of sight being different, a distinct image of a solid object is painted upon each of the two retinæ; and yet we do not, except in certain disordered conditions of vision, see *two* images, but a single one, which combines the appearance of both, and seems to stand out in relief.

Fig. 1.

Fig. 2.

Stereoscopic effect in nature, therefore, is caused by the two eyes impressing *dissimilar* images of an object; and by the brain combining these two images into one.

In order to imitate this condition of things artificially, and to produce what is termed a "stereograph," we form two pictures, such as would be seen by the right and left eye respectively, and place them in an optical instrument which by an oblique reflection or refraction of light *throws them together*, so that they appear to coincide and to proceed from the same spot. On looking into the instrument we see then one image only, which is situate midway and possesses solidity.

The following diagram, which is a sectional view of the ordinary lenticular Stereoscope, invented by Sir D. Brewster, show this:—

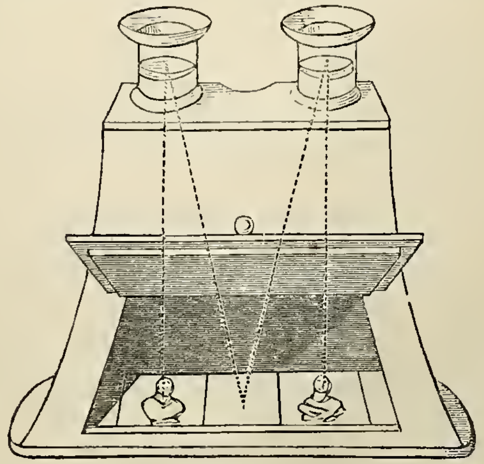


Fig. 3.

The brass tubes to which the eyes of the observer are applied contain each a *semi*-lens, which may be represented by a prism

* Continued from page 367, vol. viii. No. xii.

† Observe the effect produced by the charcoal, which if it contains Carbonate of Lime will render the liquid *alkaline* (see page 258, vol. viii.;) in that case it would be advisable to acidify with acetic acid.

placed with its sharp edge as in the figure. These lenses bend the rays of light somewhat *outwards*, so that in accordance with well-known optical laws they appear to come in the direction of the dotted lines in the diagram, and the two images coalesce at the point of their junction.

Mr. Wheatstone's *reflecting* Stereoscope, in which the same thing is accomplished by means of two mirrors placed at right angles to each other, is a more perfect form of instrument, and admits of very complete adjustment.

Rules for taking steoreoscopic Photographs.—It may seem at first that, the optical principles being understood, no further rules would be required;—that as the human eyes are separated from each other about 2½ inches, the Cameras should necessarily occupy the same position. This however is not altogether the case, and it is found by experience that considerably *more* than 2½ inches of separation is often required, in order to obtain a good result.

The effect of increasing the distance between the two positions of the camera, is to give a greater appearance of relief, or what some would term "a more model-like effect;" it must not however be extended too far, or the object, when viewed in the Stereoscope, will appear *dwarfed* and unnaturally near to the eye.

This distortion caused by separating the cameras too widely is especially seen when the stereograph embraces a variety of objects situated in different planes, as would be the case, for instance, in looking down a grove of trees. The foreground then appears shortened; the relative position of objects is disturbed, and the two pictures do not coalesce perfectly when placed in the Stereoscope.

It is an invariable rule that distant objects, to give the same relief, require to be taken at a greater angle than objects near at hand. Mr. Wheatstone's original directions were, to separate the cameras about 1 foot for each 25 feet of distance; but considerable latitude is allowable, and the amateur may experiment for himself on this point, according to the effect he desires to obtain.

For portraits, or small figures almost close to the lens, 2½ inches, or from that to four inches, will be sufficient.

In taking views and objects at some distance, about two feet of separation will be found a good average; although many make it less than this.

When *very distant* objects are to be copied, as for instance, in taking views across a river, the cameras may be placed, with special reference to them, *as far even as* 12 *feet apart*, but in that case no near objects must be admitted.

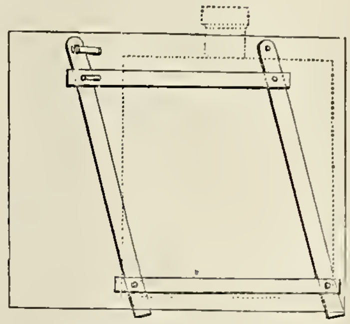
An arrangement for taking Stereoscopic pictures with a single Camera.—In photographing landscapes, buildings, etc., where the length of time elapsing between the formation of the two separate pictures is of minor importance, the ordinary camera may be employed. The first picture having been taken, the camera is moved to the proper distance, and being inclined a little *inwards* towards its former position, until some prominent object occupies the same place as before on the glass, the second image is then impressed.

This plan however does not succeed well with *portraits*, where it is necessary that no time should be lost, and hence it has been usual in that case to employ two cameras fitted with lenses of a similar focal length and corresponding as nearly as possible in rapidity of action.

Mr. Latimer Clark has devised an arrangement for working with a single camera which is exceedingly ingenious. It is adapted to take pictures of the size required for the ordinary refracting Stereoscope.

The most important feature in it, is a contrivance for rapidly moving the camera in a lateral direction without disturbing the position of the image on the ground glass, This will be understood by a reference to the following woodcut, which is explained in the inventor's own words.

"A strongly framed camera-stand carries a flat table, about 20 inches wide by 16, furnished with the usual adjustments. Upon this are laid two flat bars of wood in the direction of the object and parallel, and about the width of the camera asunder. They are 18 inches in length; their front ends carry stout pins, which descend into the table and form centres upon which they turn. Their opposite ends also carry similar pins, but these are directed upwards, and fit into the corresponding holes in the tailboard of the camera.



"Now when the camera is placed upon these pins, and moved to and fro laterally, the whole system exactly resembles the common parallel ruler. The two bars form the guides, and the camera, although capable of free lateral motion, always maintains a parallel position. In this condition of things it is only suited to take stereoscopic pictures of an object at an infinite distance; but to make it move in an arc, *converging* on an object at any nearer distance, it is only necessary to make the two guide-bars approximate at their nearer end so as to converge slightly towards the object; and by a few trials some degree of convergence will be readily found at which the image will remain as it were *fixed* on the focussing glass while the camera is moved to and fro. To admit of this adjustment one of the pins descends through a slit in the table and carries a clamping screw by means of which it is readily fixed in any required position.

"In order however to render the motion of the camera smoother, it is advisable not to place it directly upon the two guides, but to interpose two thin strips of wood, lying across them at right angles, beneath the front and back of the camera respectively (and which may be fixed to the camera if preferred) and to dust the surfaces with powdered soap-stone or French chalk."

In addition to this arrangement for moving the camera laterally the *slide* for holding the sensitive plates must be modified from the common form. It is oblong in shape, and being about ten or eleven inches long requires some little adaptation to fit it to the end of an ordinary camera.

The glasses are cut to about 6¾ inches by 3¼, and when coated with Iodide of Silver the two images are impressed side by side, the plate being shifted laterally about 2½ inches, at the same time and in the same direction as the camera itself.

In order to give the most natural effect, stereoscopic pictures should be taken at nearly the same focal distance as that at which they are to be viewed in the instrument; and hence when the refracting stereoscope is employed, small lenses of about 4½ inches focus are the best; very good stereoscopic portraits however may be taken with a 2¼ combination lens of about seven inches focus.

In photographing buildings and other architectural subjects with vertical outlines, the camera must be placed *perfectly horizontal*, or the object will appear to be falling inwards or outwards as the case may be. It is very convenient to rule the ground focussing-glass with a number of parallel lines in both directions, so as to divide off the surface into small squares like a chess-board. The position of the principal outlines of the building is thus rendered evident, and if not parallel, may be rectified.

When very small figures and objects close to the camera are taken, a stop (which may readily be made from a piece of card-board blackened with Indian ink) must be fixed in front of the lens, if a double combination one. This will prevent distortion —increase the flatness of the field—and give a greater *depth of focus, i. e.* more of the object will be distinctly seen upon the plate at the same time.

SECTION II.

On the Photographic delineation of Microscopic objects.

The Author is indebted to the personal kindness of Mr. Joseph Delves, of Tonbridge, for much of the information contained in this Section; and also to Mr. Shadbolt, for obligingly demonstrating his mode of working with artificial light.

Some of the specimens of Micro-photography which have been exhibited are exceedingly elaborate and beautiful; and their production is not difficult to one thoroughly acquainted with the use of the Microscope, and with the manipulations of the collodion process. It is important however to possess a good apparatus, and to have it properly arranged.

The object-glass of the ordinary compound Microscope is the only part actually required in Photography, but it is useful to retain the *body* for the sake of the adjustments, and the mirrors used in the illumination. The *eye-piece* however, which simply magnifies the image formed by the object-glass, is not necessary, since the same effect of enlargment may be obtained by lengthening out the dark chamber, and throwing the image further off.

Arrangement of the Apparatus.—The Microscope is placed with its body in a horizontal position, and the eye-piece being removed, a tube of paper, properly blackened in the interior, or lined with black velvet, is inserted into the instrument, to prevent irregular reflection of light from the sides.

A dark chamber of about two feet in length, having at one end an aperture for the insertion of the eye-piece end of the body, and at the other a groove for carrying the slide containing the sensitive plate, is then attached; care being taken to stop all crevices likely to admit diffused light. An ordinary camera may be employed as the dark chamber, the lens being removed, and the body lengthened out, if required, by a conical tube of gutta-percha, made to fasten into the flange of the lens in front. The whole apparatus should be placed exactly in a straight line, that the ground glass used in focussing may fall at right angles to the axis of the Microscope.

The length of the chamber, measuring from the object-glass, may be from two to three feet, according to the size of image required; but if extended beyond this, the pencil of light transmitted by the object glass is diffused over too large a surface, and a faint and unsatisfactory picture is the result. The object should be illuminated by sunlight, if it can be obtained, but a bright diffused daylight will succeed with low-power glasses, and especially when only *positives* are taken. Employ the *concave* mirror for reflecting the light on the object in the latter case, but in the former the *plane mirror* is the best, except with powers exceeding a quarter of an inch, and of large angular aperture.

The image upon the ground glass should appear bright and distinct, and the field of a circular form and evenly illuminated; when this is the case, all is ready for inserting the sensitive plate.

The time of exposure must be varied according to the intensity of the light, the sensibility of the collodion, and the degree of magnifying power; a few seconds to a minute will be about the extremes; but minute directions are not required, as the operator, if a good Photographer, will easily ascertain the proper time for exposing.

At this point a difficulty will probably occur from the plane of the chemical focus not corresponding, as a rule, with that of the visual focus. This arises from the fact that the object-glasses of Microscopes are "over corrected" for color, in order to compensate for a little chromatic aberration in the eye-piece. The violet rays, in consequence of the over-correction, are projected *beyond* the yellow, and hence the focus of chemical action is further from the glass than the visible image.

The allowance may be made by shifting the sensitive plate, or, what amounts to the same thing, by removing the object-glass a little *away* from the object with the fine adjustment screw; the latter is the most convenient. The exact distance must be determined by careful experiment for each glass; but it is greatest with the low powers, and decreases as they ascend.

Mr. Shadbolt gives the following as a guide:—"An inch and a half objective of Smith and Beck's make required to be shifted 1–50th of an inch, or two turns of *their* fine adjustment; a 2–3rds of an inch, 1–200th of an inch or half a turn; and a 4–10th of an inch, 1–1000th of an inch or about two divisions of the adjustment. With the 1–4th and higher powers, the difference between the foci was so small as to be practically unimportant."

There is also reason to think that the *kind of light* employed has an influence upon the separation of the foci. Mr. Delves finds that with sunlight the difference between them is very small even with the low powers, and inappreciable with the higher; whereas in using diffused daylight, which has undergone a previous reflection from white clouds, it is considerable.

The object-glasses of the same maker, and particularly those of different makers, also vary much; so that it will be necessary to test each glass separately, and to register the allowance which is required.

Having found the chemical focus, the principal difficulty has been overcome, and the remaining steps are the same in every respect as for ordinary collodion Photographs.

To those who cannot devote their time to Photography during the day, Mr. Shadbolt's observations on the use of artificial light may be of service. He employs *camphine*, which appears to give a whiter flame than either gas or the moderator lamp, placing the source of light in the focus of a plano-convex lens of $2\frac{1}{2}$ to 3 inches diameter (the flat side towards the lamp), and condensing the parallel rays, so obtained, on the object, by a second lens of about $1\frac{1}{2}$-inch diameter and 3-inch focus.

This mode of illumination, being feeble as regards chemical rays, is best adapted for object-glasses of low power. The exposure required to produce a Negative impression with the one-inch glass may be from three to five minutes. As the sensitive plate would be liable to become dry during that time, it is recommended to coat it with diluted honey and Nitrate of Silver, according to the mode described at page 9, and after the exposure to wash in distilled water.

The development is then conducted in the same manner as that for preserved sensitive plates, given in the last Chapter; fixing with Cyanide of Potassium before the development is fully complete, if any tendency to fogging is observed (see p. 357).

The Rev. W. Towler Kingsley has communicated a process by which very beautiful Microscopic Photographs have been obtained. He illuminates (in the absence of sunlight) with the brilliant light produced by throwing a jet of mixed Oxygen and Hydrogen gases upon a small cone of Lime or Magnesia.

Particular stress is laid upon the object-glass of the Microscope being a good one for the purpose; and indeed all who have given attention to the subject are agreed upon this point—that there is a considerable difference in the Photographic value of objectives, and this, too, independent of the angular aperture of the glass.

PART III.

Outlines of General Chemistry.

CHAPTER I.

THE CHEMICAL ELEMENTS AND THEIR COMBINATIONS.

The limits of the present work will not allow of more than a simple sketch of the subjects which it is proposed to treat in this Chapter. Our attention therefore must be confined to an explanation of certain points which are alluded to in the first part of the work, and without a proper understanding of which it will be impossible for the reader to make progress.

The following division may be adopted:—A. The more important elementary bodies, with their symbols and atomic weights.—B. The compounds formed by their union.—C. The class of salts.—D. Illustrations of the nature of chemical affinity.—E. Chemical nomenclature.—F. Symbolic notation.—G. The laws of combination.—H. The Atomic theory.—I. The chemistry of organic bodies.

A. THE CHEMICAL ELEMENTS, WITH THEIR SYMBOLS AND ATOMIC WEIGHTS.

The class of elementary bodies embraces all those substances which cannot, in the present state of our knowledge, be resolved into simple forms of matter.

The Chemical Elements are divided into "metallic" and "non-metallic," according to the possession of certain general characters.

The following are some of the principal non-metallic elements, with the symbols employed to designate them, and their atomic weights:*—

		Symbol.	Atomic Wt.
Gases.	Oxygen	O	8
	Hydrogen	H	1
	Nitrogen	N	14
	Chlorine	Cl	36
Solids.	Iodine	I	126
	Carbon	C	6
	Sulphur	S	16
	Phosphorous	P	32
Liquid.	Bromine	Br	78
Unknown.	Fluorine	F	19

The metallic elements are more numerous. The following list includes only those which are commonly known:—

		Symbol.	Atomic Wt,
Metals of the Alkalies.	Potassium	K	40
	Sodium	Na	24
Metals of the Alkaline Earths.	Barium	Ba	69
	Calcium	Ca	20
	Magnesium	Mg	12
Metals Proper.	Iron	Fe	28
	Zinc	Zn	32
	Cadmium	Cd	56
	Copper	Cu	32
	Lead	Pb	104
	Tin	Sn	59
	Arsenic	As	75
	Antimony	Sb	129
Noble Metals.	Mercury	Hg	202
	Silver	Ag	108
	Gold	Au	200
	Platinum	Pt	99

B. ON THE BINARY COMPOUNDS OF THE ELEMENTS.

Many of the elementary bodies exhibit a strong tendency to combine with each other, and so to form *compounds* which differ in properties from either of their constituent elements. This attraction, which is termed "chemical affinity," is exerted principally between bodies which are opposed to each other in their general characters. Thus, taking for example the elements Chlorine and Iodine—they are analogous in their reactions, and therefore there is but little attraction between them, whereas either of the two combines eagerly with Hydrogen, which is an element of a different class. So again, Sulphur unites with the metals, but two metallic elements are comparatively indifferent to each other.

Oxygen is by far the most important in the list of chemical elements. It combines with all the others, with the single exception perhaps of Fluorine. The attraction, or chemical affinity, however, which is exerted, varies much in different cases. The metals, as a class, are easily oxidized; whilst many of the non-metallic elements, such as Chlorine, Iodine, Bromine, etc. exhibit but little affinity for Oxygen. Also *Nitrogen* is a peculiarly negative element, showing little or no tendency to unite with either of the others.

Classification of binary compounds containing Oxygen.—When one simple element unites with another, the product is termed a "binary" compound.

There are three distinct classes of binary compounds of Oxygen;—first, *neutral* and *basic* Oxides, as *e. g.* the Oxide of Hydrogen, or Water; a neutral Oxide; the oxide of Potassium or Potash, a basic Oxide.

Water is termed a *neutral* oxide, because its affinities are low, and it is comparatively indifferent to other bodies. Potash, Oxide of Silver, etc., are *basic* oxides, (they are termed *bases* because they form the *foundation* of a new series of compounds); but there is a great difference between the two in chemical energy, the former belonging to a superior class of bases, viz. the alkalies.

General characters of the Alkalies.—By studying the properties of an alkali (such as Potash or Soda) which are familiar to all, we gain a correct notion of the whole class of basic oxides. An alkali is a substance readily soluble in water, and yielding a solution which has a slimy feel from its solvent action upon the skin. It immediately restores the blue color of reddened litmus, and changes the blue infusion of cabbage to green. Lastly, it is neutralized and loses all its characteristic properties upon the addition of any acid.

The *weaker bases* are, as a rule, sparingly or not at all soluble in water, neither have they the same caustic and solvent action upon the skin; but they restore the color of reddened litmus, and neutralize acids in the same manner as the more powerful bases or alkalies.

Second class of the binary compounds of Oxygen or Acid *Oxides.*—This class, taking the stronger acids as the type, may be described as follows:—very soluble in water, the solution possessing an intensely sour taste, and a *corroding* rather than a solvent action upon the skin; it changes the blue color of litmus, and other vegetable substances, to red, and neutrallizes the alkalies and basic oxides generally.

Observe however that these properties are possessed in very various degrees by different acids. Prussic Acid and Carbonic Acid, for instance, are not sour to the taste, and, being feeble in their reactions, reddened litmus scarcely or not at all, All acids however, without any exception, tend to combine with bases, and to neutralize themselve in that way, so that this may be said to be the most characteristic property of the class.

Chemical composition of acid and basic Oxides contrasted.—It is a law commonly observed, although with many exceptions, that basis are formed by the union of Oxygen with *metals*—and acids, by Oxygen uniting with *non-metallic elements.* Thus, Oil of Vitriol is a compound of Sulphur and Oxygen; Aqua-fortis, of Nitrogen and Oxygen; but Potash is an Oxide of Potassium, which is a metal, and the Oxide of Iron, Silver, Zinc, etc. are bases, and not acids.

Again, the composition of acids and bases is different in another respect; the former invariably contain more oxygen in proportion to the other element than the latter. Taking the same expmples as before, the two classes may be represented thus:—

Acids	Oil of Vitriol,	Sulphur	1 atom,	Oxygen,	3 atoms.
	Aqua-fortis,	Nitrogen	1 "	Oxygen,	5 "
Bases	Oxide of Silver,	Silver	1 "	Oxygen,	1 "
	Oxide of Iron,	Iron	1 "	Oxygen,	1 "

On the class of Hydrogen Acids.—Oxygen is so essentially the element which forms the acidifying principle of acids, that its very name is derived from that fact. Still there are exceptions to this rule, and in some acids *Hydrogen* appears to play the same part; the *Hydracids*, as they are termed, are formed principally by Hydrogen uniting with elements like Chlorine, Bromine, Iodine, Fluorine, etc. Thus, Muriatic or Hydrochloric Acid contains Chlorine and Hydrogen; Hydriodic Acid contains Iodine and Hydrogen.

Observe, however, that the position held by the Hydrogen in these compounds is different from that of the Oxygen in the "Oxyacids" as regards the number of atoms usually present; thus

Aqua-fortis = Nitrogen 1 atom, Oxygen 5 atoms
Muriatic Acid = Chlorine 1 " Hydrogen 1 "

so that the composition of the Hydracids is analogons to the *basic* oxides in containing a single atom of each constituent.

* For an explanation of these terms, see the latter part of the chapter.

C. ON THE TERNARY COMPOUNDS OF THE ELEMENTS.

As the various elementary substances unite with each other to form binary compounds, so these binary compounds again unite and form *tenary* compounds.

Compound bodies however do not, as a rule, unite with simple elements. In illustration, take the action of Nitric Acid upon Silver, as described at p. 175, vol. viii, No. vi. No effect is produced upon the metal until *Oxygen* is imparted; then the Oxide of Silver so formed dissolves in the Nitric Acid—in other words, it is necessary that a binary compound should be first formed before the solution can take place.

The mutual attraction or chemical affinity exhibited by compound bodies is, as in the case of elements, most strongly marked when the two substances are opposed to each other in their general properties.

Thus, *acids* do not unite with other acids, but they combine instantly with *alkalies*, the two mutually neutrallizing each other and forming "a salt."

Salts therefore are tenary compounds, produced by the union of acids and bases; common Salt, formed by neutralizing Muriatic Acid with Soda, being taken as the type of the whole class.

General characters of the Salts.—An aqueous solution of Chloride of Sodium, or common Salt, possesses those characters which are usually termed saline: it is neither sour nor corrosive. but, on the other hand, has a cooling, agreeable taste. It produces no effect upon litmus and other vegetable colors, and is wanting in those energetic reactions which are characteristic of both acids and alkalies: hence, although formed by the union of two binary compounds, it differs essentially in properties from both.

All salts however do not correspond to this description of the properties of Chloride of Sodium. The Carbonate of Potash, for instance, is an acrid and alkaline salt, and the Nitrate of Iron reddens litmus-paper. A little reflection shows the cause of such differences. A perfectly neutral salt is formed when a strong acid unites with an equally energetic base; but if, of the two constituents, one is more powerful than the other, then the reactions of that one are seen to a certain extent in the resulting salt. Thus the Nitrate of Iron reddens the vegetable color, because the Oxide of Iron, or *base* of the salt, is inferior in chemical energy to the Nitric Acid; and the Corbonate of Potash is *alkaline* to test-paper from a cause exactly the reverse; but if Nitric Acid and Soda are brought together, then a *Nitrate of Soda* is produced which is *neutral* in every sense of the term.

The Chloride af Sodium and salts of a similar kind are freely soluble in water, but all salts are not so. Some dissolve only sparingly, and others not at all. The Chloride and Iodide of Silver are examples of the latter class; they are not bitter and caustic like the Nitrate of Silver, but are perfectly tasteless, from being insoluble in the fluids of the mouth.

Therefore it is seen from these examples, and many others which might be adduced, that the popular notion of a saline body is far from being correct, and that, in the language of strict definition, any substance is a salt which is produced by the union of an acid with an alkali, altogether independent of the properties it may possess.

Thus *Cyanide of Potassium* is a true salt, although highly poisonous; Nitrate of Silver, or *Lunar Caustic*, is a salt; the blue Sulphate of Copper is a salt; so also is Chalk or Carbonate of Lime, which has neither taste, color, nor smell.

On the "Hydracid" class of Salts.—The distinction between Oxyacids and Hydracids has already been pointed out, and the latter having been shown to consist of Hydrogen united with elements analogous in their reactions to Chlorine, Iodine, Bromine, etc. In a salt formed by an Oxygen Acid, both the basic and acid elements appear. Thus the common *Nitre*, which is a Nitrate of Potash, is found by analysis to contain Oxide of Potassium as a base, in a state of combination with nitric acid. But if a salt is formed by neutralizing an alkali with *a Hydrogen Acid*, the product in that case does not contain all the elements. This is seen from the following example:—

Hydrochloric Acid + Soda
= Chloride of Sodium + Water;

or, stated more at length,—

(Chlorine Hydrogen) + (Oxygen Sodium)
= (Chlorine Sodium) + (Oxygen Hydrogen).

Observe that the Hydrogen and Oxygen, being present in the correct proportions, unite to form water, which is an oxide of hydrogen. This water passes off when the solution is evaporated, and leaves the dry crystals of salt. On the other hand, with the oxyacid salts, the elementary hydrogen being absent, no water is formed, and the oxygen remains.

Therefore it must be borne in mind that salts like the chlorides, Bromides, Iodides, etc., contain only *two* elements, but that in the Oxyacid salts, such as Sulphates, Nitrates, Acetates, *three* are present. Thus Nitrate of Silver consists of Nitrogen, Oxygen, and Silver, but chloride of silver contains simply chlorine and metallic silver united, without oxygen.

The separated Hydrogen and Oxygen again absorbed in the decomposition of Hydracid Salts.—If a portion of a Hydracid Salt—such, for instance, as the Iodide of Potassium—be dissolved in water, and a small quantity of Oil of Vitriol, or Sulphuric Acid, added, this Oil of Vitriol being very powerful in its chemical affinities, tends to destroy the existing salt and to appropriate to itself the base;—but observe—it does not remove *Potassium* and liberate *Iodine*, but it takes the *Oxide* of Potassium and sets free *Hydriodic Acid.* In other words, as an atom of water is produced during the *formation* of a Hydracid Salt, so is an atom destroyed and made to yield up its elements in the *decomposition* of a Hydracid Salt.

The reaction of dilute Sulphuric Acid upon Iodide of Potassium may be stated thus:—

Sulphuric Acid *plus* (Iodine Potassium) *plus* (Hydrogen Oxygen)
equals (Sulphuric Acid, Oxygen Potassium) or Sulphate of Potash.
and (Hydrogen Iodine) or Hydriodic Acid.

D. THE NATURE OF CHEMICAL AFFINITY FURTHER ILLUSTRATED.

Illustration from the non-metallic elements.—If a stream of Chlorine gas be passed into a solution containing the same salt as before mentioned, viz. the Iodide of Potassium, the result is to liberate a certain portion of Iodine, which dissolves in the liquid, and tinges it of a brown color. The element Chlorine, possessing a degree of chemical energy superior to that of Iodine prevails over it, and removes the Potassium with which the Iodine was previously combined.

Chlorine + Iodide of Potassium.
= Iodine + Chloride of Potassium.

The same law illustrated by the Metals.—A strip of Iron dipped in solution of Nitrate of Silver becomes immediately coated with metallic Silver; but a piece of Silver foil may be left for any length of time in Sulphate of Iron without undergoing change; the difference depends upon the fact, that metallic Iron has a greater attraction for Oxygen than Silver, and hence it displaces it from its solution.

Iron + Nitrate of Silver
= Silver + Nitrate of Iron.

Illustrations amongst Binary compounds.—If a few drops of solution of Potash or Soda be added to solution of Nitrate of Silver, a brown deposit is formed, which is the Oxide of Silver, insoluble in water,—that is to say, as a stronger metal displaces *metallic Silver*, so does an *oxide* of the same metal displace *Oxide of Silver*. Therefore, bases like the alkalies, alkaline earths, etc. cannot exist in a free state in solutions of the salts of weaker bases—a liquid containing Nitrate of Silver could not also contain free Potash or Ammonia.

In the list given at page 12, the metallic elements are arranged principally in the order of their chemical affinities, those of Potastium, Sodium, Barium, etc., being by far the most marked.

The same law also applies to binary compounds possessing acid properties—that is, the strong acids invariably displace those which are weaker from their salts, and appropriate the base. Thus, taking two illustrations familiar to Photographers—

Sulphuric Acid + Nitrate of Potash
= Nitric Acid + Sulphate of Potash.

And again,

Nitric Acid + Acetate of Silver
= Acetic Acid + Nitrate of Silver.

It is not easy to arrange the acids in a list exactly according to their affinities, but usually the Oil of Vitriol, or Sulphuric Acid, is placed first, and the Carbonic Acid, which is a gaseous substance, last. The vegetable acids, such as Acetic, Tartaric, etc., are *intermediate*, being weaker than the mineral acids, but stronger than the Carbonic, and Prussic or Hydrocyanic acids.

The order of decompositions affected by the insolubility, or the volability, of the products which may be formed.—It might be inferred, from remarks already made, that on mixing saline solutions, a gradual interchange of elements would invariably take place, until the strongest acids were associated with the strongest bases, and *vice versa*. There are many causes however which interfere to prevent this; one of which is *volatility.*—

The violent effervescence which takes place on treating a *Carbonate* of any kind with an acid is due to the *gaseous* nature of Carbonic Acid, and its escape in that form which greatly facilitates the decomposition.

Insolubility is also a cause which exercises a great influence on the result which will follow in mixing solutions. If the formation of an insoluble substance is possible by any interchange of elements, it will certainly take place. A solution of chloride of sodium added to nitrate of silver invariably produces chloride of Silver; the *insolubility* of Chloride of Silver being the cause which determines its formation.

So again, Sulphate of Lead and *Protonitrate of Iron* are produced by mixing Nitrate of Lead with Sulphate of Iron; but if an attempt is made to substitute *Nitrate of Potash* for the nitrate of lead, the result is uncertain, because, in such a case, there are no elements present which can, by interchanging, form an insoluble salt. Sulphate of Potash, although *sparingly* soluble in water, is not insoluble, like the sulphate of lead or the sulphate of baryta.

E. ON CHEMICAL NOMENCLATURE.

The nomenclature of the chemical *elements* is mostly independent of any rule; but an attempt has been made to obviate this in the case of those of later discovery. Thus the names of the newly-found *metals* usually end in "um," as Potassium, Sodium, Barium, Calcium, etc.; also those elements which possess analogous characters have corresponding terminations assigned to them, as Chlorine, Bromine, Iodine, Fluorine, etc.

Nomenclature of Binary compounds.—These are often named by attaching the termination "ide" to the more important element of the two; as, the Ox*ide* of Hydrogen, or Water; the Chlor*ide* of Silver; the Sulph*ide* of Silver. Binary compounds of Sulphur, however, are often termed Sulphurets, as the *Sulphuret* or the *Sulphide* of Silver indifferently.

When the same body combines with oxygen, or the corresponding element, in more than one proportion, the prefix "proto" is applied to that containing the least oxygen, "sesqui" to that with one and a half as much as the "proto;" "bi" or "bin" to that with twice as much; and "per" to the one containing the most oxygen of all. As examples, take the following:—the Protoxide of Iron; the Sesquioxide of Iron; the Protochloride of Mercury; the Bichloride of Mercury. In these examples the *Sesquioxide* of Iron is also a *Per*oxide, because no higher simple oxide is known, and the *Bichloride* of Mercury is a *Per*chloride for a similar reason.

When an inferior compound is discovered, it is often termed "sub;" as the Suboxide of Silver; the Subchloride of Silver. These bodies contain the least known quantity of Oxygen and Chlorine respectively, and are hence entitled to the prefix "proto;" but being of minor importance, they are excepted from the general rule.

The combinations of metallic elements with each other are termed "alloys;" or if containing mercury, "amalgams."

Nomenclature of Binary compounds possessing acid properties.—These are named on a different principle. The termination "ic" is applied to one element. Thus, taking as an illustration the liquid known as "Oil of Vitriol," it is truly an *Oxide* of Sulphur, but as it possesses strong acid properties it is termed Sulphur*ic Acid.* So Nitric Acid is an Oxide of Nitrogen; Carbonic Acid is an Oxide of Carbon, etc. When there are two oxides of the same element, both possessing acid properties, the most important has the termination "ic," and the other "ous;" as Sulphuric Acid, Sulphur*ous* Acid; Nitric Acid, Nitr*ous* Acid.

Nomenclature of the Hydracids.—The Hydrogen Acids are distinguished from Oxyacids by retaining the names of both constituents, the termination "ic" being annexed as usual. Thus, *Hydro*chloric Acid, or the Chloride of Hydrogen; *Hydr*iodic Acid, or the Iodide of Hydrogen.

Further illustrations of the nomenclature of Binary compounds.—The Oxides of Nitrogen, and also of Sulphur, afford an interesting illustration of the principles of nomenclature. The former are as follows:—

	Nitrogen.	Oxygen.
Protoxide of Nitrogen...........	1 atom.	1 atom.
Binoxide of Nitrogen...........	1 "	2 "
Nitrous Acid..................	1 "	3 "
Peroxide of Nitrogen...........	1 "	4 "
Nitric Acid....................	1 "	5 "

Observe, that two only out of the five possess acid properties, the others being simple oxides. Nitric acid is, strictly speaking, the "Peroxide," but as it belongs to the class of acids, that term naturally falls to the compound below.

The binary compounds of Sulphur with Oxygen all possess acid properties; they may be represented (in part) as follows:—

	Sulphur.	Oxygen.
Hyposulphurous Acid.........	2 atoms.	2 atoms.
Sulphurous Acid.............	1 "	2 "
Hyposulphuric Acid..........	2 "	5 "
Sulphuric Acid..............	1 "	3 "

In this case the sulphuric and Sulphurous Acids had become familiarly known before the others, intermediate in composition, were discovered. Hence, to avoid the confusion which would result from changing the nomenclature, the new bodies are termed *Hypo*sulphuric and *Hypo*sulphurous (from *hypo. under*).

Nomenclature of Salts.—Salts are named according to the acid they contain, the termination "ic" being changed into "ate," and "ous" into "ite;" thus, Sulphuric acid forms Sulph*ates*; Nitric acid, Nitr*ates*; but Sulphur*ous* acid forms Sulph*ites*, and Nitrous acid Nitr*ites*.

In naming a salt, the *base* is always placed after the acid, the term *oxide* being omitted; thus, *Nitrate of Oxide of Silver* is more shortly known as "Nitrate of Silver," the presence of oxygen being understood.

When there are two oxides of the same base, both of which are *salifiable*—in naming the salts, the term "proto" is prefixed to the acid of the salt formed by the lowest, and "per" to that of the higher oxide; as, the *Proto*sulphate of Iron, or Sulphate of the Protoxide; the *Per*sulphate of Iron, or Sulphate of the Peroxide.

Many salts contain more than one atom of acid to each atom of base. In that case, the usual prefixes expressive of quantity, are adopted; thus, the *Bi*sulphate of Potash contains twice as much Sulphuric acid as the neutral Sulphate; the *Sesqui*carbonate of Soda $1\frac{1}{2}$ times as much Carbonic acid as the ordinary Barbonate.

On the other hand, there are salts in which the base is in excess with regard to the acid, and which are usually known as "basic salts;" thus the red powder which deposits from solution of Sulphate of Iron is a *basic* Persulphate of Iron, or a Sulphate of the Peroxide of Iron with more than the normal proportion of oxide.

Nomenclature of the Hydracid Salts.—The composition of these salts being different from those formed by oxygen acids, the nomenclature varies also. Thus, in neutralizing Hydrochloric acid with soda, the product formed is not known as hydrochlorate of soda, but as *Chloride of Sodium*; this salt, and others of a similar constitution, being *binary*, and not *ternary*, compounds. The salt produced by Hydrochloric acid and *Ammonia*, however, is often called "Muriate, or Hydrochlorate of

Ammonia," although more strictly it should be the *Chloride of Ammonia.*

F. ON SYMBOLIC NOTATION.

The list of symbols employed to represent the various elementary bodies is given at page 12. Commonly the initial letter of the Latin name is used, a second, or smaller, letter being added when two elements correspond in their initials; thus C stands for carbon, Cl for chlorine, Cd for cadmium, and Cu for copper.

The chemical symbol however, does not simply represent a particular element; it denotes also a definite weight, or equivalent proportion of that element. This will be explained more fully whilst speaking of the laws of combination.

Formula of Compounds.—In the *nomenclature* of compounds it is usual to place the Oxygen or analogous element *first* in the case of binary compounds, and the acid before the base with the ternary compounds, or salts; but in representing them symbolically this order is reversed; thus, Oxide of Silver is written AgO, and never as OAg; Nitrate of Silver as $AgO\ NO_5$, not NO_5AgO.

The juxtaposition of symbols expresses combination; thus, FeO is a compound of one proportion of Iron with one of Oxygen, or the "Protoxide of Iron;" if more than one equivalent is present, small figures are placed below the symbols; thus, Fe_2O_3 represents two equivalents of Iron united with three of Oxygen, or the "Peroxide of Iron;" SO_3, one equivalent of Sulphur with three of Oxygen, or Sulphuric acid.

Larger figures placed before and in the same line with the symbols, affect the *whole compound* which the symbols express; thus, $2SO_3$ means two equivalents of Sulphuric Acid; $3NO_5$. three equivalents of Nitric acid. The interposition of a *comma* prevents the influence of the large figure from extending further. Thus the double Hyposulphite of Soda and Silver is represented as follows:—

$$2NaOS_2O_2,\ AgO\ S_2O_2,$$

or *two* equivalents of Hyposulphite of Soda with *one* of Hyposulphite of Silver; the large figure referring only to the first half of the formula. Sometimes however brackets, etc, are employed, in order to render a complicated formula more plain. For example, the formula for the double Hyposulphite of Gold and Soda, or the "Sel d'Or," may be written thus:—

$$3\ (NaO\ S_2O_2)\ AuO\ S_2O_2+4\ HO.$$

In this formula the *plus* sign (+) denotes that the four atoms of water which follow are less intimately united with the framework of the salt than the other constituents. The use of a *plus* sign is commonly adopted in representing salts which contain water of crystallization. Thus the formula for the crystallized Protosulphate of Iron is written as follows:—

$$FeO\ SO_3+7\ HO.$$

These atoms of water are driven off by the application of heat, leaving a white substance, which is the anhydrous salt, and would be written simply as $FeO\ SO_3$

The *plus* sigh however is often employed in token of simple *addition*, no combination of any kind being intended. Thus the decomposition which follows on mixing Chloride of Sodium with Nitrate of Silver may be written as follows:—

$$NaCl+AgO\ NO_5=AgCl+NaO\ NO_5\ ;$$

that is—

Chloride of Sodium *added to* Nitrate of Silver
= Chloride of Silver *and* Nitrate of Soda.

G. ON EQUIVALENT PROPORTIONS.

When elementary or compound bodies enter into chemical union with each other, they do not combine in indefinite proportions, as in the case of a mixture of two liquids, or the solution of a saline body in water. On the other hand, a certain definite weight of the one unites with an equally definite weight of the other, and if an excess of either is present, it remains free and uncombined.

Thus, if we take *a single grain* of the element Hydrogen—to convert that grain into water there will be required exactly 8 grains of Oxygen; and if a larger quantity than this were added, as for instance, 10 *grains*, then two grains would be over and above. So, to form *Hydrochloric Acid*, 1 grain of Hydrogen takes 36 grains of Chlorine; for the *Hydriodic Acid*, 1 grain of Hydrogen unites with 126 grains of Iodine.

Again, if separate portions of metallic Silver, of 108 grains each, are weighed out—in order to convert them into Oxide, Chloride, and Iodide of Silver respectively, there would be required—

Oxygen....................	8 grains.
Chlorine....................	36 "
Iodine....................	126 "

Therefore it appears that 8 grains of Oxygen are *equivalent* to 36 grains of chlorine and to 126 grains Iodine, seeing that these quantities all play the same part in the combination; and so it is with regard to the other elements—to every one of them a figure can be assigned which represents the number of parts by weight in which that element unites with others these figures are the "equivalents" or "combining proportions," and they are denoted by the *symbol* of the element. A symbol does not stand as a simple representative of an element, but as a representative of *one equivalent* of an element. Thus "O" indicates 8 parts by weight of Oxygen; Cl one equivalent, or 36 parts by weight, of chlorine; and so with the rest.

Observe however that these figures are termed "equivalents" do not refer to the *actual number* of parts by weight, but only the *ratio* which exists between them: if Oxygen is 8, then Chlorine is 36, but if we term Oxygen 100, as some have proposed, then chlorine would be 442·65.

In the scale of equivalents now usually adopted, Hydrogen, as being the lowest of all, is taken as unity, and the others are related to this.

Equivalents of Compounds.—The law of equivalent proportions applies to compounds as well as to simple bodies, the combining proportion of a compound being always the *sum* of the equivalents of its constituents. Thus Sulphur is 16, and Oxygen 8, therefore Sulphuric Acid, or SO_3, equals 40. The equivalent of Nitrogen is 14, and that of Nitric Acid, or NO_5, is 54. The same rule applies to salts. Take, for instance, the Nitrate of Silver; it contains

	Equivalent.
Nitrogen....................	14
6 Oxygen....................	48
Silver....................	108
Total of equivalents, or equivalent of the Nitrate of Silver, ...	170

Practical application of the Laws of Combination.—The utility of being acquainted with the law of combining proportions is obvious when their nature is understood. As bodies both unite with and replace each other in equivalents, a simple calculation shows at once how much each element or compound will be required in a given reaction. Thus, supposing it is desired to convert 100 grains of Nitrate of Silver into *Chloride* of Silver, the weight of salt which will be necessary is deduced thus:—one equivalent, or 170 parts, of Nitrate of Silver, is decomposed by an equivalent, or 60 parts, of Chloride of Sodium. Therefore

$$\text{as } 170 : 60 :: 100 : 35{\cdot}2;$$

that is, 35·2 grains of salt will precipitate, in the state of Chloride, the whole of the Silver contained in 100 grains of Nitrate (*id est*, 1 of salt decomposes, nearly, 3 of Nitrate).

So again, in order to form the Iodide of Silver—what are about the proportions in which the two salts should be mixed? The equivalent of Iodide of Potassium is 166, and that of Nitrate of Silver is 170. These numbers so nearly correspond, that it is common to direct that *equal weights* of the two salts should be taken.

One more illustration will suffice. Supposing it is required to

form 20 *grains* of Iodide of Silver—how much Iodide of Potassium and Nitrate of Silver must be used? One equivalent, or 166 parts, of Iodide of Potassium, will yield an equivalent, or 234 parts, of Iodide of Silver, therefore

as 234 : 166 :: 20 : 14·2.

Hence, if 14·2 grains of the Iodide of Potassium be dissolved in water, and 14·5 grains of the Nitrate of Silver added, the yellow precipitate, when washed and dried, will weigh precisely 20 grains.

H. ON THE ATOMIC THEORY.

The atomic theory, originally proposed by Dalton, so much facilitates the comprehension of chemical reactions generally, that it may be useful to give a short sketch of it before we proceed.

It is supposed that all matter is made up of an infinite number of minute atoms, which are elementary, and do not admit of further division. Each of these atoms possesses an actual weight, although inappreciable by our present methods of investigation. Simple atoms, by uniting with each other, form *compound atoms*, and when these compounds are broken up, the elementary constituent atoms are not destroyed, but separate from each other, in possession of all their original properties.

In representing the simple atomic structure of bodies, *circles* may be used, as in the following diagram.

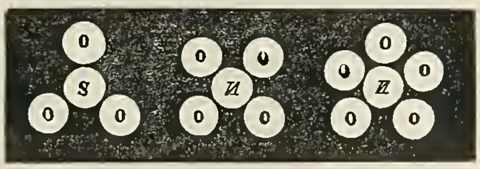


Fig. 1. Fig. 2. Fig. 3.

Fig. 1 is a compound atom of Sulphuric Acid, consisting of an atom of Sulphur united intimately with three of Oxygen; fig. 2 is an atom of Peroxide of Nitrogen, NO_4; and fig. 3, an atom of Nitric Acid, composed of Nitrogen 1 atom, Oxygen 5 atoms, or in symbols NO_5.

The term "atomic weight" substituted for equivalent proportion.—If we suppose that the simple atoms of different kinds of matter *differ in weight*, and that this difference is expressed by their equivalent numbers, the whole laws of combination follow by the simplest reasoning. It is easy to understand that an atom of one element or compound would displace, or be substituted for, a single atom of another; therefore, taking as the illustration the decomposition of Iodide of Potassium by Chlorine, the weight of the latter element required to liberate 126 grains of Iodine is 36 grains, *because the weights of the atoms of those two elementary bodies are as* 36 *to* 126. So again, in the reaction between Chloride of Sodium and Nitrate of Silver, a compound atom of the former, represented by the weight 60, reacts upon a compound atom of the latter, which equals 170.

Therefore in the place of the term "equivalent" or "combining proportion," it is more usual to employ that of "atomic weight." Thus the atomic weight of Oxygen is 8, represented by the symbol O; that of Sulphur is 16; hence the atomic weight of the compound atom of Sulphuric Acid, or SO_3, is necessarily equal to the combined weights of the four simple atoms; *id est*, 16+24=40.

I. ON THE CHEMISTRY OF ORGANIC SUBSTANCES.

By "organic" substances are meant those which have possessed *life*, with definite organs and tissues, in contradistinction to the various forms of dead inorganic matter, in which no structural organization of that kind is found. The term organic, however, is also applied to substances which are obtained by chemical processes from the vegetable and animal kingdom, although they cannot themselves be said to be living bodies; thus *Acetic Acid*, procured by the distillation of woody fibre, and Alcohol, by fermentation from Starch, are strictly organic substances.

The class of organic bodies embraces a great variety of products, which, like inorganic Oxides, may be divided into neutral, acid, and basic.

The organic *acids* are numerous, including Acetic Acid, Tartaric, Citric, and a variety of others.

The *neutral substances* cannot easily be assimilated to any class of inorganic compounds; as examples, take Starch. Sugar, Lignine, etc.

The *basis* are also a large class. They are mostly rare substances, not familiarly known; Morphia, obtained from Opium; Quinia, from Quinine; Nicotine, from Tobacco, are illustrations.

Composition of organic and inorganic bodies contrasted.—There are more than fifty elementary substances found in the inorganic kingdom, but only *four*, commonly speaking, in the organic; these four are Carbon, Hydrogen, Nitrogen and Oxygen. Some organic bodies,—Oil of Turpentine, Naphtha, etc., contain only Carbon and Hydrogen; many others—such as sugars, gum, alcohol, fats, vegetable acids—Carbon, Hydrogen and Oxygen. The *Nitrogenous bodies*, so called, containing Nitrogen in addition to the other elements, are principally substances derived from animal and vegetable tissues, such as Albumen, Caseine, Gelatine, etc.; Sulphur and Phosphorous are also present in many of the Nitrogenous bodies, but only to a small extent.

Organic substances, although simple as regards the number of elements involved in their formation, are often highly complex in the arrangement of the atoms; this may be illustrated by the following formulæ.

Starch................	$C_{24}H_{20}O_{20}$
Lignine................	$C_{24}H_{20}O_{20}$
Cane Sugar............	$C_{24}H_{22}O_{22}$
Grape Sugar...........	$C_{24}H_{28}O_{28}$

Inorganic bodies, as already shown, unite *in pairs*—two elements join to form a binary compound; two binary compounds produce a salt; two salts associated together form a double salt. With organic bodies however the arrangement is different—the elementary atoms are all grouped equally in one compound atom, which is highly complex in structure and cannot be split up into binary products.

Observe also, as characteristic of Organic Chemistry, the apparent similarity in composition between bodies which differ widely in properties. As examples, take *Lignine*, or cotton fibre, and *Starch*, each of which contains the three elements united as $C_{24}H_{20}O_{20}$.

Mode of distinguishing between organic and inorganic matter.—A simple means of doing this is as follows:—place the suspected substance upon a piece of platinum-foil, and heat it to redness with a spirit-lamp; if it first *blackens*, and then burns completely away, it is probably of organic origin. This test depends upon the fact, that the constituent elements of organic bodies are all either themselves volatile, or capable of forming volatile combinations with Oxygen. Inorganic substances, on the other hand, are often unaffected by heat, or, if volatile, are dissipated without previous charring.

The action of heat upon organic matter may further be illustrated by the combustion of coal or wood in an ordinary furnace:—first, an escape of Carbon and Hydrogen, united in the form of volatile gaseous matter, takes place, leaving behind a black cinder, which consists of Carbon and inorganic matter combined; afterwards this Carbon burns away into Carbonic Acid, and a grey ash is left, which is composed of inorganic salts, and is indestructible by heat.

(To be continued.)

Decision and promptitude, even though sometimes a man may err for want of due deliberation, will, in the long run, more often conduct to success, than a slow judgment that comes too late.

From the Jour. of the Phot. Soc.

SOME OBSERVATIONS UPON PHOTOGRAPHIC PRINTING.

BY GEORGE SHADBOLT.

The subject upon which I purpose offering a few remarks is one of vital importance to photographers of nearly every species; whether advocates of the collodion or talbotype, the albumen or the waxed-paper processes; for however much they may differ upon the merits of their respective modes of producing good negatives, the printing process may be regarded as a sort of focus where all the others unite, and as such may command a degree of interest not accorded to any of the other departments of the art.

It may be objected that so rudimentary a matter as the printing process has been long ago exhausted, and that formulæ have been multiplied almost *ad infinitum.* This is partly true and partly false; for though it must be conceded that more attention has been directed to this branch of art than any other, it is also very obvious that the formulæ given in such abundance are mostly empirical, whilst the reasons for adoptiug particular modes of proceeding rest chiefly upon caprice.

The "Printing Committee" appointed by this Society are actively prosecuting their investigations upon all the various ramifications of this branch of photography; but as their inquiry must necessarily involve the lapse of a considerable amount of time before the question is finally disposd of, I have thought it advisable to lay before you, *as an individual*, certain points which appear to me worthy of consideration, and some results which have occurred during the experiments I have been performing.

The first point that strikes me as one upon which doctors differ more perhaps than upon any other, is this, viz. the advantage of the print beiug thoroughly *in* the paper or simply upon its surface. To this I have directed very much attention, the more so as it has been put forward from various quarters as accounting, to a certain extent, for the want of stability in some photographs having little more than a surface layer—by none perhaps more urgently thau Mr. Sutton, in what I cannot but regard as his very clever advertisements in the body of the Journal of the Photographic Society.

Now with all due deference to this dictum of Mr. Sutton, I must eutirely dissent from the opinion expressed, that the *stability* of a photograph is in *any way* dependent upon the fact of the picture being iu, or simply *upon* the paper, for I assert that it rests solely upon the nature of the material composing the picture, and the influences brought to bear upon this material.

If it could be shown that there is any *real* foundation for considering photographs *in* the substance of the paper more stable thau those on the surface, no hesitation whatever should be allowed as to the immediate adoption, *exclusively*, of printing in a manner conformable with such fact; but if, as I believe from practical experience, that so far *as regards stability* it is totally beside the question, the next consideration to be determined is the pictorial effect produced by the two modes of proceeding; and here again I am obliged to differ from Mr. Sutton's conclusion most emphatically. I have tried numerous experiments to determine this point satisfactorily, and am firmly couvinced that the more the picture is kept upon the surface of the paper, the more brilliant is the effect, and the more perfectly is the detail, especially of the half tones, brought out, and that anything like soaking the solutions into the paper produces a flat and unsatisfactory effect.

Of course I do not put this forth as anything more than my own individual *opinion*, founded upon direct experiment.

The superior brilliancy and delicacy of detail exhibited in proofs upon albuminized paper, are illustrative of this fact, as I conceive that it is owing to the surface nature of the impression that such superiority exists.

But with regard to albuminized paper, it is not available in all cases, as the offensive and vulgar glare which it possesses sometimes is more detrimental to pictorial effect than is counterbalanced by the other advautages, and I see no reason why all the delicacy of albuminized proofs shonld not be retained by adopting other means to this end, and yet be free from so unpleasant a defect as the glare alluded to.

I must again object, by the way, to the unfounded aspersion of Mr. Sutton's, relative to the lights of the pictures upon albuminized papers being necessarily, of the "*exact colour of cheese.*" Now this is by no means necessary, nor is their indeed any difficulty in obviatiug this defect, to which I shall allude hereafter. I may as well state at once, as I have already had occasion to oppose Mr. Sutton's notions several times, that I consider he has made suggestions of such value in photographic printing as far outweigh any such trifling errors as he has promulgated; manipulators will soon discover the errors and abandon them, but the valuable suggestions are not so easily arrived at; I allude more especially to the bath of sel d'or (double hyposulphite of gold and soda), and the great importance of getting rid of the free nitrate of silver when the proof has been produced, before colouring and fixing.

I quite agree with Mr. Sutton that we have no option about colouring our print, as without this process it is valueless as a work of art.

Upon a former occasion I stated that no process of photographic printing could be considered as approaching perfection while the operation in the pressure-frame had to be carried on until the picture was almost obliterated by over-exposure, iu order to allow for the destructive effect of the fixing and colouring baths.

The remedy for this evil has been supplied by the bath of sel d'or, and now the precise effect of a picture can be seen before its removal from the pressure frame.

The destruction of coloured proofs by the old process is mainly due to sulphurization to an excess, arising either from the decomposition of the old hyposulphite of soda, or from moisture in conjunction with a small portion of the fixing bath remaiuing from defective washing. The use of the bath of sel d'or enables us to dispense with hyposulphite of soda as a fixing agent altogether.

I have hitherto said nothing as regards the paper upon which our proofs are to be impressed, because, provided they are free from metallic particles, also from detrimental chemical substances, much will depend upon individual taste and peculiarities of manipulation.

Personally I prefer papers sized with starch, like most of that made by the continental producers; but there is one kind of English paper that is to me almost as agreeable to work with, if not quite so, and the results are certainly equal or superior to those on any foreign paper,—I allude to Towgood's positive paper, and it has the advautage of being inexpensive.

The mode of applying the solutions should be such as is most convenient to the operator concerned, but certain modifications in the various strengths must be adapted to the means of application. Thus, if the glass rod be used, the streugth should be at least double what is used for floating.

I may here remark, that for comparative experiments, I consider applicatiou by the rod as infinitely more definite than, and superior to, any other mode whatever, and as a matter of personal convenience I invariably adopt it for applying the nitrate of silver.

There is a point much neglected in makiug comparative experiments by those photographers who are deficient in chemical knowledge, and which consequently gives rise to the expression of very conflicting opinions,—I mean the relative proportion of what is technically called the *salting material*, in other words, the vehicle of the chlorine.

Speakiug in round numbers, there is as much chlorine in 5 grains of chloride of ammonium as in 6 grs. of chloride of sodium, or in 10 grs. of chloride of barium; hence if the same strength of solution of uitrate of silver be used for exciting papers prepared with these various chlorides, the amount of free nitrate of silver is materially affected, unless the proportion of salting materials, already pointed out, has been carefully adjusted. Provided this has been attended to, with the process I am about to detail, it is immaterial which of the chlorides are made use of,

so far as the resnltiug tone of the finished picture is concerned, but as liquid ammonia enters iuto the formulæ, it is a saving of trouble, as regards filtration, to make use of cbloride of ammonium, thus obviating the deposit otherwise formed.

From the considerations already discnssed I beg to offer the following *modus operandi*, one that I cau safely recommend as capable of producing excellent and uniform resnlts; practical experience fully coroborating the theoretically preconceived uotions. I have availed myself largely of the labours of others in selecting good points of manipulation, especially from Mr. Sutton's descriptions, but bave added or rejected other details from my own experience.

Having selected the paper, it is to be marked upou oue side in order to recoguize that which is to be subjected to the chemicals, which last should be applied upon that side of the paper whicb is free from *stripes by reflected light*. Some specimeus of paper appear to have a beautifully smootb and glossy surface before preparation, but lose it afterwards; others retain it more or less thoroughly, aud some kiuds wbich I occasionally employ, have the gloss partially restored, after having lost it, by carefully rubbing with a silk handkerchief. For tbe process now described, Canson's *positive* paper, Mariou's thick, a paper having a water-mark R. K. B., Rives, or Towgood's positive, are those I use in preference. Canson's paper is *very* good, wben good, but apt to be contamiuated to an excesssive extent with extremely minute particles of some metal, which in the fiuished pictnre spoil it by a corresponding number of miuute white specks. The worst feature about this defect is the fact, that the preseuce of these particles is not easily detectable uutil the picture is placed in the *fixing bath*. Marion's thick paper has a very fine and permaueut surface, but it should be salted by tbe operater, as that prepared in this way by thc makers is too much *saturated* witb the cbloride, and not ouly is it cxtravagaut to use, but a flatuess of effect is the result. Moreover tbey use a uniform solutiou of the strength of 4 per cent., whatever may be the chloride employed.

Towgood's paper requires to be floated ou the saltiug bath, provided this mode of application be adopted, about twice as long as the others mentioned.

To prepare thc salting solution, take gum tragacanth (gum dragon) in powder, about 30 graius, put it iuto a small bottle and add 1 fluid oz. of Liq. Amuouiæ Fortis (stroug hartshorn), shake it up until the latter is saturated, then pour it off and add 1 fluid oz. of water. To each ounce of the above add 10 grains of chloride of ammonium, or 20 of chloride of barium, the former preferred, as the latter must stand and be filtered before using. The whole should present a slightly milky appearauce.

If the operator can use the glass rod, 25 minims for each quarter sheet (size 11 in. × 9in.) should be measured out and spread evenly over it; but if floating be prefered, just layiug tbe paper down and immediately removing it is sufficieut, except for Towgood's paper, which must be left for about twenty seconds. Of course the sheets must be hung up to dry. The mucilage formed keeps the chloride much ou the surface of the paper, and is perfectly free from the slightest glare.

To excitc the papers thus prcpared, 25 minims of a 60-grain solutiou of uitrate of silver should be applied witb a glass rod to each sheet, or they may bc floated for about half a minute upou a 30-grain solutiou.

When dry, they are to be exposed in the pressure frame until the whole of the details of the picture are perfectly priuted, taking especial care that the *lights* are uot overdone—if some of tbe deepest shadows are bronzed it is of uo cousequence; but witb a good negative the picture should preseut au agreeable effect, the colour being of a rich purplish cast. The broziug of the deep shadows is in uo way detrimental, as this is removed in the subsequent operations, but the lights must not be overdoue, otherwise it is difficult, if uot impossible, to obtain a good effect. On removal from the frame, the print should be floated upon some clean filtered water *face downwards* for about five or ten minutes, tbe water poured off and a fresh dishful supplied, the print being this time submerged, and in about five minutes time hung up to dry or to drain well. The free nitrate of silver is by this treatment (which should take place in the dark room) removed, all except a mere trace. After draining, the proof may be kept is a dry state, *in the dark* for some days, if more convenieut, or may at once be submitted to the bath of sel d'or or to be colored. This batb is made by dissolving half a grain of crystallized sel d'or in each ounce of water, and then adding half a minim hydrochloric acid to a like quantity. It can be made extemporaneously, as snggested by Mr. Pollock, at a much cheaper rate, by mixiug in equal proportions solutions of chloride of gold, of a known strength, and hyposulpbite of soda of *three times* the strength of gold solution, then adding the hydrochloric acid, when a solution of a bright red tint results, but which afterwards becomes colorless. The same solntion may be used repeatedly until it becomes exhausted of gold, whicb will be known by its coloring more and more slowly nntil it ceases to act altogether.

The proofs may be eitber floated or submerged until the desired purple black tint is attaiued, which occurs very speedily in a uew bath; the action, however, must be stopped before the lights become all *blue*: the bronzed parts, if any, will attain a ricb black tone. On removal from this bath, they may at once be submitted to another composed of carbouate of soda (common washing soda) in the proportion of one part *saturated solution* to six or seven of water, iu which it may remain nntil the starch (if any) in the paper is dissolved out.

From this bath it should go into water, and theu iuto the fixiug bath; aud here a novelty of some importance may be adopted, premising that it must be done in a room protected from common light.

Chloride of silver is *perfectly* soluble in ammonia, and the proofs prepared as above indicated may be immersed theirin without iu the *least injuring* the tones acquired in the bath of sel d'or; finally, the proofs must be washed in two or three waters and dried. Ammonia has been before suggested as a fixing agent, or rather one for removing the unaltered chloride of silver, bnt unfortunately it also removes that which forms the picture wheu produced in the ordiuary way, the deposit of gold, however, resists it most perfectly.

Thc advantage to be gained is the absence of any material to induce sulphurizatiou, and thus avoiding oue, if not the only cause, of fadiug.

It is necessary to usc ammonia for fixing in *a darkened room*, as the light acts most rapidly upou chloride of silver when dissolved by tbe menstruum indicated. The washings necessary after this fixiug agent may be very rapidly performed, and tbus a considerably saviug of time be effected; but it must be admitted that it is not a *pleasant* substance to operate with. The only point I have not yet ascertained is, how *dilute* a solution may be employed, but one part of Liq. Amm. Fortis to tbree of water is quite strong enough.

Should hyposulphitc of soda be preferred, one part of a saturated solution to threc of water may be used instead, without any visible alteration of the proof; but iu this case more careful washing afterwards must be attended to; and it appears immaterial whether the bath of carbouate of soda is nsed before or after the byposulpbite.

The chief object of tbe carbonate of soda is to obviate the occurreuce of a peculiarly anuoyiug mottled appearace in the *fabric* of the paper, ofteu invisible on either side, but conspicuous by transmitted light, and which frequently, nay, mostly, appears ouly after some time when soaking out the hyposulphite of soda.

As I have uoticed it only in paper sized with starch, and find that the *total* removal of this substance eutirely prevents the defect complained of, I conclude that it is owiug to some compound of that material with sulphur.

I remarked upon tbe facility of obviating the degradation of the whites wben manipulating with albuminized paper. This can be most perfectly accomplished by adding a few drops of *acetic acid* to the exciting liquid, being careful to *wash it away with the free nitrate of silver* before submittiug it to the bath of *sel d'or*, or that of old byposulphitc. The former material is, however, so superior that I look upou the old hypo-baths as a remnant of the dark ages of photography.

Lastly, if ammonia be used as a fixing agent, I believe that the bath of carbonate of soda may be safely dispensed with; but

in this case the proof should be *well* washed in common water on its removal from the coloring bath previously to its being fixed. The carbonate of soda does not remove the albumen after the action of the nitrate of silver thereon.

Mr. Hardwich.—Will Mr.Shadbolt allow me to ask him one question on that peculiar mottled appearance that he speaks of? My attention was directed to it some time since, and I examined a large number of pictures that I had, to see if I could make anything of it. I printed by Sutton's tone process, and I found that the spots were on the paper some time after sensiting, but before printing. I think the excess of nitrate of silver is apt to enter into some sort of combination with the organic matter of the paper, and hence is not so easily extracted by the fixing bath, and that those spots will probably not make their appearance if the paper is used within a few hours. I noticed that when the spots occurred there was a deadness in the print.

I should like to ask Mr. Shadbolt whether those spots are not more apt to come when the paper has been kept for some time after being sensitized?

Mr. Shadbolt.—I can answer Mr. Hardwich's question to some extent. I purposely, on one occasion, produced those effects in a picture, and it was done on a sheet of paper prepared and dried by the fire and then used immediately. I have no doubt that a paper which had been kept, for any length of time would be more likely to present that appearance, but I am also convinced that it is easy to produce that effect when you wish it.

Mr. Hardwich.—Would you recommend a soda bath to be used invariably, or only under the circumstances alluded to.

I have not noticed those spots in a single case where I have used the paper immediately.

Mr. Shadbolt.—It is no doubt advisable to diminish the number of baths; but in starch papers you cannot make sure of their not appearing unless you use the soda bath.

THE PHOTOGRAPHIC GALLERIES OF AMERICA.

NUMBER ONE—NEW YORK.

New York, *January* 1, 1856.

Mr. Editor—I have been paying a friendly visit to the votaries of the sun-god and send you the result of my investigations which you may perhaps deem proper to publish in your valuable Journal. I have treated all with impartiality and have taken *cuique suum* as my standard. Undeserved praise is flattery, and I cannot believe that any (ethically speaking) would crave it. I feel assured that all will acknowledge that my censures have been rightly placed and my praise not too fulsome. In such an art as photography it seems strange that any will remain in listless idleness satisfied with what they have produced while others are soaring far beyond and producing pictures which if not perfection, establish the fact that perfection is near at hand.

It is true that only the real artist at heart can produce artistic pictures, yet the chief faults which I have descried are owing to an utter disregard or ignorance of known principals, which if thoroughly understood and carried out would produce results (which to all but the eye of the artist) would equal the best. This I think is owing to the erroneous opinion held by practical photographers that theories in photography are worthless—they therefore read little connected with the art, and are satisfied with what they are doing, little remembering that though they have a certain process whereby they have produced and are producing pictures, there are a thousand and one little nothings connected with it which if great attention and care and a little chemical knowledge are not brought to bear, is the great (to them hidden) cause why at one time by the same process, they obtain a passable picture, and at another nought but a disgusting shadow.

My first visit was paid to the gallery of Messrs. Meade, Brothers. I at once felt that I was in one of the favorite haunts of the goddess of photography; I could distinctly perceive her presence in everything around me, and right daintily did I tread over the carpets, throwing back my shoulders, and assuming the most enchanting demeanor, lest the goddess, who cannot endure aught that is ugly, might not permit me to wander through this gallery of beauty. How tasteful is the arrangement of the gallery; order reigns throughout, and one is forced to admit that the artist's hand is visible everywhere.

At the first picture on which my eye fell, I began to soliloquize—perfect, said I—yet I knew that perfection had not been attained. I examined more closely—the outlines sharp, the backgrounds clear, the plates clean, the glasses unsoiled—yes, but should not all pictures possess these qualities. No skill is here required? Why, then, did I halt so suddenly before this picture? 'Twas the life-like expression, the eye full of purpose, the lips parted so sweetly in that natural smile; and more, "the artist waved his radiant wand, the gift of Phos" and bade me pause.

The Meade, Brothers show a lively interest in the art, looking forward to something besides gain. They look and act the artists and seem to think more of the beauty than the quantity of their productions. One could linger long in this gallery, and yet feel he had not done justice to the specimens.

I noticed a fine interior and exterior view of the Palais Royal taken by them in Paris. It is the perfection of skill and delicacy, the minutest details are well-developed; also one of Queen Victoria, Prince Albert, Empress Eugenie and Louis Napoleon, taken from life at the Crystal Palace.

Their Ambrotypes and Photographs are decidedly superior, such as might be expected from these artists.

Passing up Broadway to Franklin-st., I dropped in at Brady's This gentleman is well known to the community; his untiring efforts in the establishment and perfection of the photographic art have long been remarked. In his splendid gallery we find pictures far exceeding our expections based, on reports floating. Taking out my note-book, I stood deliberating a long time as to what I should say of his pictures. To use the term good were nonsense; excellent, not much better; fine? no—I therefore determined to employ no epithet whatever, if I could not give the true one. The transparent colored Photographs show the hand of a first class artist, I have not seen them equaled at any other establishment; I also noticed a specimen of Photography on canvas; among the Ambrotypes was one taken on Evacuation day of the Veterans of 1812, and another, of the Kane expedition. They should be seen to be appreciated. This gallery stands A No. 1.

Let one who is even unaccustomed to viewing photographic pictures step into Root's gallery and he is struck with admiration at the beauty of these portraits. The slightest peculiarity in photographic pictures is at once visible to the eye of the artist, and pictures to which certain epithets may be applied by the mass, are classed under a totally different appellation by the artist. Comparing these portraits of Root with those of other superior artists we are *prima facie* inclined to say that they possess nearly equal merit. But the artist may see differently.

Taking one peculiarity, for instance, we should say that the eye in Root's portraits is life-like and not surpassed if equalled by any; yet a casual observer might not perceive this at first glance, it needs critical comparison.

This gallery gets up first-rate Ambrotypes. Among them I noticed a very fine portrait of a young girl, whose large lustrous eyes and raven black tresses falling so voluptiously over her fair shoulders

> "You'd swear each clustering lock could feel—
> And curled to give her neck caresses,"

completely fascinated me. I should caution susceptible young gentlemen from paying too lengthy a visit to Root's as some of his female portraits are captivating.

Our next visit was to Gurney's, and here I found a veritable temple of art—another Palladium of Photography. I made a critical examination of the Ambrotypes, Photographs and Daguerreotypes, and feel assured that this artist has deserved the lofty position he has attained by his energy and determination among his competitors. The presentation of the

Anthony Prize Pitcher to this gentlemen speaks volumes for his merit, when it is remembered that it was awarded by our most distinguished savans. Photography seems to be upon the most friendly terms with this artist, at the command of whom she breathes her warmest inspirations.

M. M. Lawrence—This gallery is deserving of all the praise that could possibly be bestowed upon it. Most of the pictures are exquisite, The eye, that all-important feature of the face, is sharp and clear, the outlines perfect and the general tone, &c. of the portraits faultless. The photographs and ambrotypes keep pace with the best. Mr. Lawrence is widely known both as a gentleman and an artist and his establishment is one of the few which have a solid and firm foundation.

Tomlinson's gallery is substantially an Ambrotype gallery. Entire attention is devoted to this process and this may be the cause of their superiority. They are really excellent. I saw nothing like them in the course of my rambles. There are some Ambrotype portraits in this gallery which can challenge competition. Many ambrotypes we have seen have the appearance of Chinese pictures on rice paper. But here we have a picture possessing great depth of tone and yet giving the whites and blacks with perfect demarcation.

N. G. Burgess—Here again we have a first-rate Ambrotyper; one who is theoretically and practically acquainted with this process and seems determined not to be excelled. I believe he has a patent for a peculiâr style of picture.

A very fine specimen of the process is a portrait of a fair child leaning on a table ; it is perfectly life-like.

Bogardus—This gentleman is well-known to the public. He has gone through the photographic mill, and mastered all the difficulties of the art. His pictures are sharp, clear and well-developed. They possess an artistic excellence which distinguishes them above the mass. His galleries are very tastefully arranged and the specimens are so placed that their advantages are at once perceived ; (this is not often the case.)

We cannot select any one specimen as being superior to the rest, there is an *evenness* and *regularity* throughout. Mr. Bogardus seems to have his hands full. He deserves it.

Lewis, Chatham Street—I had long heard of this artist and determined to give him a call. I was much pleased with his gallery. There were few specimens on hand, however, which show the superior skill of this gentleman. He ranks, however, I believe with the A No. 1's.

M. L Battel—Here again we encounter the artist. The ambrotypes are excellent. The photographs are worthy of much praise. The gallery is very pleasant and tastefully arranged.

Gaige—Another artist, another excellent gallery. The ambrotypes are fair, but susceptible of improvement. We were much pleased with the daguerreotypes. The photographs lack depth of tone.

Quinby & Co.—On the whole I should call this a very fair gallery. Some of the pictures may deserve a stronger epithet however. I like the arrangement of the gallery.

Bedell—Cleanliness is next to godliness, especially is this the case in photographic galleries. Very excellent pictures are often underrated from the fact of the glass being soiled or the plate or paper spotted. This gallery contains some excellent specimens.

Kimball—The daguerreotypes are pretty fair. There is room for improvement, however, in the Ambrotypes.

Kertson—I should advise this gentleman to pay more attention to focussing his pictures. As a general thing they are dim and either over or under developed.

Beckers & Piard—This is an excellent gallery. I was really pleased with their specimens of stereoscope ambrotypes. These gentlemen excel in this branch of the art. The gallery contains a large collection of stereoscopic views which are worth looking at. Both these gentlemen have been connected with the art ever since its first introduction into this country, and their talents in an artistic point of view, as well as their skill in manipulation, is proverbially of the highest order.

Thompson, 313 Broadway—This gallery I believe is pretty well known. There is little fault to be found with the pictures, they are sharp, well-developed and clear, three great requisites. The ambrotypes are as good as can be expected from the newness of the process. On the whole I think the public in general will listen to the name of Thompson with different feelings than Mr. Toodle.

Insleys—This is an old established gallery. I perceived that the new processes had made little innovation here, on the true principal, I suppose of becoming perfect in one thing ere we commence another. If so, the pictures carry out the supposition.

Farrand—The show case contains some very fine specimens. The reception-room, however, is a vacuum, nothing to attract the eye, an indispensable consideration in daguerrean galleries.

Holmes—The ambrotypes are good. The daguerreotypes look as though they might be improved. The photographs are pretty fair, and some superior. The galleries are very nicely arranged.

J. T. Barnes—A general dimness and want of sharpness is the general feature of these specimens, which is a fault scarcely excusable that being one so easily overcome. It is strange artists are not more careful what pictures they expose as specimens. In some galleries I have seen pictures which can hardly be called shadows. If a picture is sharp many faults are overlooked. No picture lacking sharpness and depth of tone should be hung up as a specimen. Some pictures I have seen stand forth boldly from their backgrounds, and I was not obliged to keep my head going from one side to the other of the plate in order to make out the contours, though as to other particulars they were perhaps quite as bad. There are some fine local views in this gallery which show great delicacy.

Hunter's—I was pleased to observe that the proprietor of this gallery is still hunting after the best method for daguerreotyping. May the hunter be successful.

"The games afoot, follow your spirit," &c.

Watson's, formerly Plumb's—Most of the specimens I believe were taken by Plumb. There was therefore little to judge from. I believe, however, this artist possesses merit.

Genney—Some of the specimens are very fair. It is a neat gallery and everything is well arranged.

Wellman, 546 Broadway—This is a well conducted gallery. Many specimens very artistic, they all possess sharpness. The eyes, however, are not as well developed as they might be.

L. L. Lewis, Broadway—I admired these pictures especially for their regularity. They are sharp and clear ; the eyes are well defined and show some animation. I was much pleased with the arrangements.

D. Baremore—What I could see of his specimens were to his credit. The gallery is quite too dark however, to permit of a critical examination.

Anson's gallery is decidedly superior. It is most tasteful in its arrangement, and great order and cleanliness are preserved throughout. The specimens all show the artist's hand. This gallery deserves the most liberal patronage.

Haas—The photographs by this artist are in the first style of the art, as is I believe all that he undertakes. Most of them general in being portraits.

Knapp's—Most of the specimens in this gallery are old, but this artist has no doubt since made great improvement. This, however, I have observed in many galleries is left for supposition, as few new specimens are exposed. Fresh improvements are made every day, and it consequently can be of no advantage to an artist to keep up a lot of old specimens.

Atwood—A respectable gallery. Few specimens on hand to judge from.

J. E. Loiseau—A French artist. The gallery contains some very fair photographs.

King's, Bowery—This is a substanial gallery. Excellent pictures are taken here. The daguerreotypes are clear and sharp. I saw no ambrotypes or photographs.

Knapp's, Bowery. No specimens on which to form a judgment.

Jube's, Bowery—Fair daguerreotypist. Very well arranged gallery and I should say his process was good.

S. D. Jones—Many of the daguerreotypes are deserving of great praise. Others again the contrary.

Martin & Paine—These gentlemen join two professions in one, book-keeping and daguerreotyping. Some pretty fair photographs.

Professor Loud—This artist is determined not to lose custom by being silent. A small label is attached to each of his pictures stating the peculiar value of each. His ivory stereoscopic pictures are pretty fair, as also some of his ambrotypes. Professor Loud seems to doubt the correctness of the term ambrotype by the following label; "Glass picture, by *some* called Ambrotype." Professor Loud is also a poet, as the following will show:

> Ambrotype—Of the sweet forms we cherish
> Secure this kind of picture
> E're the substance perish.

Hunt's cor. Broome—I cannot say much for these pictures, the most, that they are passable. Some however would seem to have come from the artist's hand.

Hamilton—A young operator. Let him be determined not to be outstripped in the race, but to read, mark, learn and inwardly digest the great principles connected with Photography and he must succeed.

Enny—Most of these specimens bear examination. I should pronounce them fair. I should say however, that the process he employs (if I am not mistaken) is not calculated to produce a very sharp picture.

Hunt's, Bowery—This artist seeems thoroughly to understand that when a silver plate is coated with dry iodine, exposed to an accelerator and then transferred to the camera, that a shadow of a person placed before it will be impressed upon the plate. May such knowledge meet with its reward.

Ross, Bowery—To this artist I would say, that there is room for great improvement in his pictures.

C. D. Hunt—There is some order in the arrangement of this gallery. Some of the ambrotypes are pretty fair specimens of the process. This is the "only place where *engraved* stereoscope ambrotypes may be obtained."

Snongrass—Some of these specimens may pass as daguerreotypes. The grounds are very much clouded and the picture looks as though pasted on the plate. Improve! Improve!

Phillips—The specimens in this gallery, are, on the whole, deserving of credit.

Barcalo—A really good artist. His ambrotypes are excellent. I believe he has a large run of custom. This is a very good criterion to judge by.

Bacon—Pretty fair pictures; some sharp and clear, others not so good. The gallery is a very comfortable little parlor, containing a piano, &c. Very pleasant for the ladies.

Thwaites, Chatham street—A mediocre artist. The daguerreotypes look clear and fair. We noticed no ambrotypes or photographs.

J. Brill's, Chatham street—The daguerreotypes are very good; the photographs are not in the highest perfection, some however excel.

Kain, Chatham street—The photographs in this gallery, as a general thing look pretty fair. We saw nothing however to prove this gentleman an artist.

Reed's, Chatham Street—The usual style of daguereotypes. No improvements visible.

Weston—A first class artist. His gallery is well-arranged and his pictures admirable. He deserves much credit.

Quinby—Great want of sharpness and clearuess in the pictures, otherwise pretty fair specimens.

Jackson & Weeks—Some specimens good, some bad, some miserable. Very little attention paid to order and cleanliness.

Welling, Bleecker street—Some of the specimens in this gallery are creditable. Most of the picture, however, appear to be overtimed. Remedy this defect and there will be little else to correct.

Demarest. A. G.—The general style of daguerreotypes. Very little artistic merit. Why do not daguerreotypists cultivate such an interest in the art as will lead them to exhibit no specimens of their ability which are not really meritorious. It were better their rooms were empty.

Bogert—An old established gallery. Some very artistic specimens.

Lockwood, 18th street—I cannot say much for this gallery. The artist must be young in the art, and therein his excuse.

J. B. Gardner—Very fair specimens, much superior to ordinary galleries.

Jackson & Waters—The general style of daguerreotypes; pretty fair. There is much need of improvement, however.

Holmes, 8th Avenue—Improvement I should think had been quite forgotten in this gallery. It is not too late, however to retrieve.

Davis—Some of the specimens look well. No doubt pretty fair pictures can be obtained here.

Burns—I noticed some very poor pictures in this gallery, although I have seen worse.

Rose—25 cent daguerreotypes. "Walk in without knocking," I did so, but art had fled, noiseless as was my entrance.

Beckwith—"Read, mark, learn and inwardly digest," should be the motto of this gentleman, and better pictures would be the result.

Cooper & Demarest—A pretty fair gallery this. It is located in an old stand and doing a fair business.

Taylor—Some of the ambrotypes excel. The daguerreotypes need improvement.

Mayer—An excellent gallery. The ambrotypes show some skill, and I noticed some very fair photographs.

Cuique Suum.

From the Jour. of the Phot. Soc.

A METHOD OF COMBINING
The Daguerreotype and Albumen Processes, with a View to Increased Facility in the Production of Instantaneous Photographs in the Field.

To the Editor of the Photographic Journal:

Sir,—I think most of your correspondents will agree with me that a perfect Dagnerreotype, as regards its structure, is sharper and finer than any other photographic image; albumen comes next to it, then collodion. . . I purpose to show, that from a small Daguerreotype, provided it be very sharp and good, a large albumen negative may be made, equal in every respect to a collodion one of the same dimensions.

The following process I consider peculiarly applicable to the taking of animals and all objects in motion at a distance from home; before proceeding any further, permit me to premise that I have never taken Daguerreotypes, but only copied them; the hypotheses I go upon are the following: that the silver plate gains in sensitiveness during the first twelve hours; that it is more economical and easier to work than any other process; that its cleanliness, photographically speaking, should be proverbial, and its sensitiveness now nearly, if not quite, equals that of positive collodion. Should it appear that the silver plate does not possess most of the above qualities, I should give up this process for field work and recommend Mr. Archer's registered camera; still the copying camera here described would be useful for enlarging negatives, drawings, &c. On the other hand, should the plate possess the qualities I have enumerated, it is then in our power to prepare any number of plates on the morning previous to an excursion, to expose them during that day to the instantaneous action of light with a double lens and a sun-lit landscape, and to develope each plate successively at night, the only apparatus required for the journey being a box, holding twenty-four prepared plates, fitting closely into a pocket camera, the double ¼ lens, and an iron walking stick stand.

I belive it to be an established fact that small pictures are taken more rapidly by a small, sharp, and fine double lens of full aperture, than those larger ones taken by a larger, and consequently more stopped objective. I do not vouch for the truth of this last

statement, but take it for granted; I have practised Messrs. Shadbolt and Wenham's processes, but failed in getting sharp copies. Their *data*, however, are excellent: the negative to copy has not that hard outline so very characteristic of the Daguerreotype plate; then collodion and iodized paper by reason of their texture do not form such a sharp image as albumen. Now, as the definition of an ordinary negative decreases with its enlargement, it must be evident to all, that by uniting two such hard surfaces as I have specified, a beautifuly soft and well defined picture must necessarily be the result.

The double-bodied reproducing camera should be made of deal 3 feet long; one end has a groove to receive a dark frame carrying a plate 12×10 inches; on the other, which must be exactly parallel to it, screw one of Ross's ¼-plate double lenses, viz. the same that produced the Daguerreotype about to be copied, which must be nailed to some firm wooden support, about 3 inches in front of the lens, and also parallel to the end of the camera; it should have its centre and the optic axis of the lens coincident; place the whole upon a firm table by a north window or one shaded from the direct rays of the sun. The Daguerreotype may be about 2 inches square, and after being copied may be cleaned off and the plate polished for another impression; any size from 3 to 12 inches square may be obtained by lessening the focal length of the camera. After focussing, it may be as well to put a ¼-inch stop upon the lens, which will materially add to the definition. I sensitize a certain number of albumen plates, expose them the next day, and develope them at night, when the exact time of exposure is ascertained: it is about an hour in the light I have indicated. Any number of pictures may be done in succession with little chance of failure; the albumen negative glass process is very easy; I practise Messrs. Mayall and Negretti's processes, and adopt whichever forms of manipulation appear best in either of them. The pneumatic lever plate-holder, as sold by Mr. Bolton of Holborn Bars, seems to have some advantages over the gutta percha one now in use; I also use the vertical silver bath as being cleaner than the other. The reproducing camera is equally applicable to the enlargment of microscopic objects, by putting them in the place of the daguerreotype.

One word upon negative and positive paper-work. The grain in paper can never be overcome; in the negative, figures and clouds cannot be obtained; the positive never looks finished unless under a glass. I know that it will create a smile among photograpers when I say that I entreat them by all means to give it up as well as collodion. Let them print from albumen negatives albumen positives, and back up with pure white varnish.

In conclusion, I may observe that the above remarks are based upon a series of careful experiments and forwarded to you with the sole view of advancing in a degree, however small, the interests of this most pleasing art.

When photography shall have attained the power of depicting all natural objects in their correlative proportions of light and shade, figures and clouds harmoniously blended with all that is sublime and beautiful in nature, *then* will it justly take its stand in the ranks of high art; in the mean time and every event I rejoice in the opportunity now afforded me of testifying to you the sense I entertain of this periodical, and permit me, Mr. Editor, to subscribe myself with all sentiments of respect,

Your obedient Servant,

Charles Heckford Bennington.

Courage.—True bravery is sedate and inoffensive ; if it refuse to submit to insults, it offers none ; begins no disputes, enters into no needless quarrels ; is above the little troublesome ambition to be distinguished every moment : it hears in silence, and replies with modesty ; fearing no enemy, and making none ; and is as much ashamed of insolence as of cowardice.

— A thousand probabilities do not make one truth.

— We hope to grow old ; yet we fear old age.

For the Photographic and Fine Art Journal.

NOTES OF A TRIP TO EUROPE.—No. II.

Philadelphia, January, 1856.

Friend Snelling.—In my previous letter I gave you a hasty glance of Photography in Europe—leaving it for a future communication to go more fully into the merits of that which I have seen. As my visit to the Old World was not to see the works of Photography alone, but in connection with it to see as much as possible of the Fine Arts in general, therefore in giving you my impressions of what I have seen, it will make my letter more as *notes of travel* than the doings of the Heliographist; and at the same time I can lay but little before your readers but what they are already acquainted with, through your diligence in collecting and laying before them all useful information in your valuable journal. But as I have seen many of the productions of those to whom the fraternity are much indebted for the information they have so liberally given to the public at different periods; and at the same time their friendly manner has allowed me to see their practical results, and a short description of the galleries I have visited may not be uninteresting to those engaged in the art here.

I left Philadelphia in May last in the Packet from this port. I was persuaded by some of my friends to go thus in preference to the Steamers, and I can assure you I never regretted the choice. The vessel was a fast sailer, added to which there was an agreeable company of passengers on board. The time flew rapidly, the only drawback was being becalmed for some days; but I made myself merry over the restlessness of some, as I had made up my mind from the start to take matters as they came, or else one may keep himself in a continual fever, with small annoyances that you are sure to meet with in travelling. The weather most of the time was fine, with the exception of the two last days, when we had a good opportunity to witness old ocean in an angry mood.

"Thy voice is like the thunder, and thy sleep
Is as a giant's slumber, loud and deep."

It was a grand sight; yet for myself I feel more at ease on *terra firma*. On the morning of the 26th day we saw land; it was the southern coast of "Swate Ireland." Now, there is an enjoyment in the sight of land, after one has been weeks at sea, that a landsman knows nothing of. It is a real luxury. We were two days getting into Liverpool, where I stayed but the shortest possible time. I saw some dull looking daguerreotypes as I passed through some of the streets; whether it was the weather or the dense smoke that gave them such a dingy appearance, I can't say. I was soon in the cars on my way to "mighty London." The weather was delightful, and as I passed along I had a fine look at the lively pastoral scenes of "Merry England,"—a perfect garden—while here and there might be seen some fine old Baronial mansion lending beauty to the view. It was near midnight when I arrived in London. All that I could see of this mighty Babylon, was the twinkling of millions of lights as far as the eye could reach. Early next morning I strolled out from my quarters; it seemed as if I was amongst old friends, so familiar was the name of one street after another. Fleet street; Piccadilly; the Strand—do they not sound familiar? And there was old St. Paul's, with its towering dome, looking like an old acquaintance, with its blackened, smoky look. We are not so familiar with its appearance through the Photographic art, as most of the fine old buildings of Europe, owing to it being so closely built up as to allow no opportunity to get a fine view. I felt as if I would like to see all the surrounding buildings swept off, so that this superb edifice could be seen without the danger of breaking one's neck by standing at its base and looking up. I ascended the dome, from which you have a lovely view, providing you are fortunate to be there on a fine day. I was lucky in that particular. You can then see the extent of the city. All I can say, it is immense. I also descended into the crypt where rests the remains of "England's Glory," Nelson and Wellington. The interior is adorned with many beautiful statues by Flaxman and others.

It being the season for the yearly exhibition of the different

Societies of artists, I thought I would pay each a visit, as they would be closed before I returned to London. The Society of Water Colors pleased me much; there was many products that ranked far beyond what I thought it possible to arrive at in this branch. In fact, the English water color school, is the first in Europe. The exhibition of the Royal Academy did not please me. I was greatly disappointed. There was a littleness and want of power in the whole collection; with but few exceptions, those of the most power seemed to be running away in experiment. There exists no such painters at the present day in England, as Gainsborough, Reynolds, Wilkie, and Turner. It is a marvel how art can retrograde where the works of these artists exists. Yet such must be the conviction of all who will contrast them with the unnatural productions of McCleese, and a host of his followers. I will admit Stanfield is good in his way, yet there is a want of force in his large works. Robert's interiors are most beautifully painted, and show marks of careful study; but this is not the highest order of Art. The architecture of England of the present day I think is but mediocrity. I think there is no better evidence of what I say than the New House of Parliament—a huge square, full of straight lines, loaded with small ornaments, which are entirely lost at the distance from which you see the building properly. There seems to have been no effort to effect by illuminating and casting picturesque shadows, which in fact is the great desideratum of the exterior of an edifice. Buckingham Palace is another mass of jumbled-up buildings—but I shall have to stop this strain, or you will think that I am prejudiced, but such is not the case. I have seen much to admire. Windsor Castle is the most perfect in Europe; it is grand! Here are some fine paintings by Vandyke and Sir Thos. Lawrence. The queen was not there at the time of my visit, but I was favored with a card of admittance by our Minister, which gave me a good opportunity to see both her and Prince Albert; I was much pleased with the looks of both.

I shall not say much about Photography in London at this time, as my visit then was short. I called on Mr. Mayall; he has a fine establishment, though it looks small after the large galleries of America. But to have such rooms there would be attended with enormous rents. He was very busy. I had not the pleasure of his previous acquaintance, but from his reputation in the Art I made free to introduce myself. I made but a short stay, as I was anxious to get off to Paris. I did not call on any others, but left it until my return. I spent a couple of days viewing that which was to be seen around London, and then packed up for the Continent. Yours,

F. D. B. Richards.

From the Journal of the Photographic Society.

FIRST REPORT

Of the Committee Appointed to take into Consideration the Question of the Fading of Positive Photographic Pictures upon Paper.

The Committee, in this Report, propose to confine themselves to a statement of the evidence which they have collected as to the permanence of photographs up to the time of their appointment, adding some facts in connexion with the causes of fading, which are of practical value, reserving for a future occasion the scientific part of the investigation.

Evidence of Permanence.

The Committee have unquestionable evidence of the existence of photographs which have remained unaltered for more than ten years, prepared by salting plain paper with a chloride, afterwards making it sensitive with either nitrate or ammonio-nitrate of silver, fixing with a freshly-made solution of hyposulphite of soda and washing in water;—also of positives produced by Mr. Talbot's negative process.

They have not been able to obtain evidence of photographs having been prepared at all upon albumenized paper, or colored with a salt of gold or fixed with "old hypo," so long ago as ten years.

They have, however, ample evidence of the existence of unaltered photographs so prepared five, six, and seven years ago.

They have not found that any method of printing which has been commonly followed, will necessarily produce fading pictures, if certain precautions be adopted, nor have they evidence that any method which has been adopted, will not produce fading pictures unless such precautions are taken.

Causes of Fading.

The most common cause of fading, has been the presence of hyposulphite of soda, left in the paper from imperfect washing after fixing.

The Committee think it right to state, that they have been unable to find any test to be relied upon, which can be used to detect a minute portion of hyposulphite of soda, in the presence of the other substances which are obtained by boiling photographs in distilled water and evaporating to dryness; yet they have no doubt of the truth of the above statement, from the history given of the mode of washing adopted.

The continued action of sulphuretted hydrogen and water will rapidly destroy every kind of photograph; and as there are traces of this gas at all times present in the atmosphere, and occasionally in a London atmosphere very evident traces, it appears reasonable to suppose that what is effected rapidly in the laboratory with a strong solution of the gas, will take place also slowly but surely in the presence of moisture, by the action of the very minute portion in the atmosphere.

The Committee find that there is no known method of producing pictures which will remain unaltered under the continued action of moisture and the atmosphere in London.

They find that pictures may be exposed to dry sulphuretted hydrogen gas for some time with comparatively little alteration, and that pictures in the coloration of which gold has been used, are acted upon by the gas, whether dry or in solution, less rapidly than any others.

They also find that some pictures which have remained unaltered for years, kept in dry places, have rapidly faded when exposed to a moist atmosphere.

Hence it appears that the most ordinary cause of fading, may be traced to the presence of sulphur, the source of which may be intrinsic from hyposulphite left in the print, or extrinsic from the atmosphere, and in either case the action is much more rapid in the presence of moisture.

Mode of Mounting Photographs.

The Committee find that taking equal weights, dried at a temperature of 212°, of the three substances most frequently used, viz. gelatine, gum and paste, the latter attracts nearly twice as much moisture as either of the former; and as in practice a much smaller weight of gelatine is used than of gum, gelatine appears to be the best medium of these three; and the Committee have evidence of fading having in some cases been produced by the use of paste.

In illustration of some of the circumstances alluded to above, the Committee think it well to mention some instances of prints at present in their possession.

Out of several prepared together in 1844, three are unaltered, and these were varnished soon after their preparation with copal varnish.

Half of another print of the same date was varnished, and the other half left; the unvarnished half has faded, the varnished remains unaltered. Three pictures were prepared in 1846, all at the same time, with the same treatment; when finished, one was kept unmounted; the other two was mounted with flour-paste at the same time, one of these latter having been first coated with Canada balsam; at present the unmounted one and the one protected with the balsam are unchanged, whereas the other has faded.

A picture prepared in 1846 was so exposed that the lower part of it became wetted with rain; at present the part so wetted has faded, while the rest of it remains unaltered. Seve-

ral pictures were prepared and mounted about ten years ago, and kept in a dry room for about three years without any change, after which they were placed in a very damp situation, and then faded desidedly in a few months.

The Committee propose very shortly to actualy test the durability of the various modes of printing, by exposing pictures to different treatment, and they have been fortuuate enough to obtain a grant of space for this purpose from the Crystal Palace Company.

The Committee make the following suggestions, arising out of the above Report:—

1. That the greatest care should be bestowed upon the washing of the prints after the use of hyposulphite of soda, and for this purpose hot water is very much better than cold.

2. The majority of the Committee think that gold, in some form, should be used in the preparation of pictures, although every variety of tint may be obtained without it*.

3. That photographs be kept dry.

4. That trials be made of substances likely to protect the prints from the air and moisture, such as caoutchouc, gutta percha, wax, and the different varnishes.

Philip H. Delamotte.
Hugh W. Diamond.
T. Frederick Hardwich.
T. A. Malone.
John Percy.
Henry Pollock.
Geo. Shadbolt.

For the Photographic & Fine Art Journal.

COMMUNICATION.

Elkhorn, Walworth Co., Wis.
Nov. 20, 1855.

Mr. Editor—Sir—Though my pen has been silent, yet the Photographic Art-Journal or its claims upon me have not been forgotten ; nor will they be so long as its monthly visits are greeted with a happy satisfaction, and your untiring zeal for the benefit and amusement of your readers is so apparent.

Doubtlesss you have the satisfaction of knowing that your efforts are duly appreciated by very many of your subscribers, but, methinks, you would more highly value their kind regards, did they try to lighten your burdens by more frequent contributions to its columus as you have ofteu intimated. When I receive the Journal my eye runs with avidity over its contents for home contributions, and when the lively and sarcastic pen of Webster & Brothers, or the professional one of experienced American artists record some amusing or perplexing incidents in daguerrean life, or the progress and triumph of some new development of the mysterious power of light, combined with Art, I only wish there were more ready to communicate their experience and results. Charity, however, leads me to suggest as an excuse, the absorbing uature of the business. That the practice of photography has to the lover of Science and admirer of Art its pleasing features are admitted, yet that it has its perplexities when pursued as a means of pecuniary profit, is also true. How many after a days perplexing toil, and unsatisfactory effort to please a fastidious or ignorant class of subjects, have left the scene of their labors with impatient disgust, and sought a sleepless pillow, to dream of shadows black and white, of restless children and disappointed mothers ; but clouds and sunshine, light and shade alternate in this life, and no one knows better its variations and mutations, perhaps, than the practical photographer. May we not hope that in the multiplication of types and graphs, which the progressive science of the day is developing, the summit of perfection may at last be reached, when both operator and subject will be convinced that Art has triumphed that nothing better can be produced. When that time shall have arrived, Mr. Editor, I trust the Photographic Art Journal will be hailed as one of the grand luminaries whose refulgent rays have abundantly aided to bring about the desired results. I intended to have spoken of the types and shadows of Wisconsin, its abundance of picture makers, its beautiful scenery, its extensive and fruitful prairies, its charming groves, its crystal lakes, and its rapid growth in wealth and the improvement of modern time, but winter has early given warning of its chilly approach and drives away the beauties of summer, and the coulds and gloom of autumn have checked the inspiration of poesy in my own soul and I must defer what I intended for some more favored hour. Accept my best wishes for not only the abundant success of the Photographic and Fine Art Journal, but the Home Garland announced by Mrs. Snelling, May that indeed be a chaplet of such exceeding excellency and beauty, that many a heart shall be embued with its fragrance and many a brow crowned with its unfading flowers.

Yours, Respectfully,
M. W. Barnes.

* Dr. Percy and Mr. Malone consider that there is not sufficient evidence in favor of gold, to warrant this recommendation of its general use.

Photographic Society of London.

Ordinary Meeting.

November 1, 1855.

Sir Frederick Pollock, Lord Chief Baron, President, in the Chair.

The president opened the business of the Meeting with a brief address.—Gentlemen, in meeting you this evening I think it only uecessary to remind you that this is not the Annual Meeting. Although we meet after the long vacation, it is merely one of the ordinary meetings of the society; and therefore I do not think it right to take up your time by making any further observation than this, that I believe the members of the society have not been idle during the recess. And I think I may report that the Committee which have been sitting on the very important inquiry you are all aware of, have certainly been very active, and I believe you will have an acount this evening intimating what sort of of a report they mean to present in a very short time.

The progress of the science generally, I believe, has been quite commensurate with that which may fairly be expected from the zeal and enterprise of so many eminent persons who are practically devoted to the art.

The Minutes of the preceding Meeting, Juue 7th, 1855, were read and confirmed.

Mr. Henry Pollock.—Before the reading of papers before the Society tonight, perhaps I may be allowed, as the Secretary of the Committee which was appointed to take into consideration the question of the fading of positives, to make a few remarks to the Society upon what we have been doing.

I am very glad to able to state that Mr. Malone has become a member of the Committee.

The first Report will be ready for approaching Number of the Jonrnal of the Society. We were unable to prepare it for tonight, because we have been met by some difficulties in experiments which require to be repeated before we could state certainly the results. In the first Report, we propose to confine ourselves to practical statements, and not to go into the scientific part of the question, which involve difficulties that you would all admit to be very great, but which we have found to be still greater than we had supposed.

On the very threshold we were met by the difficulty of obtaining tests, which could only be appreciated by those who have attempted to go into the matter.

I have much pleasure in telling you, as I am sure you will all be pleased to hear, that Mr. Hardwich has consented to undertake a series of experiments and investigations in the theoretical part of the question; for which purpose a grant has been placed at his disposal by the Society.

The Rev. J. B. Reade read a paper "On the use of Gutta Purcha as a substitute for glass in the practice of Photography."

Mr. G. Shadbolt read a paper "On Positive Printing." (See page 17).

The thanks of the Society were voted to the authors of these communications.

The Meeting then adjourned to Thursday, Dec. 6.

ON THE USE OF GUTTA PERCHA AS A SUBSTITUTE FOR GLASS IN THE PRACTICE OF PHOTOGRAPHY.

BY THE REV. J. B. READE, M.A., F.R.S.

It has been observed more than once, that as the season for practical Photography declines, speculative Photography raises its head. If, then, the few remarks which I am about to offer should cause me to be regarded by some as too theoretical, I must fall back upon those whose experience gives weight to their opinions, and who have pressed me into the service of the Society this evening.

It is probably known to many that a substitute for glass is a great desideratum to the practical photographer. The cost of glass is a serious diminution to the profits of the professional artist, and loss from breakage, especially when 200 valuable negatives are broken at a time (an accident which lately happened), compels a man to ask whether he cannot be supplied with an article as clear as glass and as tough as leather. I venture to offer gutta percha as such substitute. It possesses the good qualities of glass in its present transparency and evenness of surface, while its cost is trifling and its attraction of cohesion perfect.

My experiments have recently been carried on in conjunction with my friend Mr. Millar, the resident medical superintendent of the Bucks Lunatic Asylum at Stone, and we can now present gutta percha in such a form as warrants us to ask for the opinion of our brother photographers.

In the first place we dissolve gutta percha in benzole, one of the peculiar hydro-carbons of coal tar naphtha, or in chloroform. The latter solvent was suggested to us by Mr. Brushfield, the medical superintendent of the Lunatic Asylum at Chester. Thirty grains of gutta percha added to an ounce of either solvent, and then poured upon a plate of glass, and the excess drained off into a bottle, as in the use of collodion, produces the film upon which we have worked.

The sample of benzole which we have received from Messrs. Hopkin and Williams, dissolved the common sheet gutta percha of the shops (not a perfectly pure article) with great readiness, upon the application of heat. Immersing the bottle in hot water is sufficient. The coloring matter producing the well-known pinkish tint, fell to the bottom of the bottle, and above it was a solution as clear and colorless as water.

This was poured upon a glass plate as I have described, and immediately dried or nearly so by holding it over a spirit lamp or some other source of heat. This precaution for securing an evenness of surface is more necessary with the benzole than with the chloroform solvent, though its advantage even in the latter case is apparent. The film adheres perfectly to the glass, and it has no tendency to separate from it on subsequent immersion in the nitrate bath if the edges of the glass are rather rough ; but if, as in some cases, they are smooth and polished, it is advisable when the film is dry, to secure it firmly and certainly by passing the four edges of the coated glass through the flame of a spirit lamp. By this method about $\frac{1}{8}$th of an inch of the film is dissolved, or nearly so, all round the surface of the glass, and no separation can be produced by any amount of immersion in water. This film, now firmly fixed upon the glass, is treated in the subsequent process as if it were glass.

The iodized collodion is poured upon it and sensitized in the usual way, and the picture is taken, developed, fixed and varnished. The point of a knife is now carried round the edge of the glass for the purpose of scraping off the small portion of the film which had been semi-dissolved by heat to secure its perfect adherence. It is then placed in water for a minute or two, one edge of the film is slightly raised so that the fingers can take hold of it, and the whole separates with great facility and floats. By raising the glass up to it, it can be taken out on its surface, placed with the film downwards on blotting-paper, and the glass drawn from it. When dry, place the film between two pieces of paper, hold it up to the light and cut the paper—and at the same time the film, which is perfectly visible through the paper—to any required size.

We have now a negative ready for the printing frame, taken on a material as durable and manageable as glass, but occupying only a small portion of its space, and perfectly free from the peculiar risks which so often put valuable negatives altogether *hors de combat*.

In consequence of benzole having the property of becoming solid at a temperature of 32°, the gutta percha dissolved in it, unless it be a very thin film similar to that now exhibited, has a tendency to become opaque, which might possibly interfere with the subsequent printing from the negative. This defect is wholly avoided by dissolving the benzole film, when dry, in chloroform, and then using the chloroform film, which never becomes opaque, for the purpose proposed. I understand from Mr. De la Rue, that one of the products of Birmese naphtha, which he is about to introduce, will form the best solvent, and produce a thick transparent film at all temperatures.

The pure chloroform solution obtained, as above described, may be used, according to the happy suggestion of Mr. Pollock, as a protecting varnish for positives, and if applied to both sides of the picture, injury from atmospheric influence seems scarcely possible. The "Printing Committee" will probably turn their attention to this application of it.

Such is the result of our present experiments ; but it is easy to see that in the hands of the chemical photographer this beautiful film is destined to play an important part in the future progress of the art. With this guess, however, I had better stop lest I should pass from the *terra firma* of facts to the realms of amusing but perhaps profitless speculation.

I will only add, as bearing directly upon the subject, that Mr. Archer, to whom I have shown some of my specimens, informs me that he has recently taken out a patent for some substitute for glass. I have the pleasure of learning from him that his process is quite different from ours, inasmuch as he was unable to make his film adhere to the glass, and, therefore he failed to secure the most valuable feature of our process. His pictures are taken in the usual way ; a film is subsequently placed upon them, they are removed from the glass by water, and the negatives are printed through the film. This method, which Mr. Archer considers less perfect than ours, is nevertheless of the utmost importance to his professional pursuits, inasmuch as he is able, with not more than half a dozen plates of glass, to take a photographic tour and send home a portfolio of negatives with perfect safety and by post.

In the discussion which followed, the Rev. J. B. Reade said :

I may add that it is not difficult to iodize the solution of gutta percha itself, taking pictures upon it quite independently of the use of collodion, and also that a mixture of collodion and gutta percha is not bad ; but I think, upon the whole, the proper place for the gutta percha to occupy is this which I propose as a substitute for the glass. We then deal with collodion, which is by far the best preparation put into our hands for sensitizing, and upon which we take pictures. We deal with it in the usual way, and put upon the film as if we were putting upon glass

You are then quite independent of glass, and may keep a stock in a small portfolio.

Mr. Foster—May I take the liberty of asking Mr. Reade if he has a print of one of his pictures ?

The Rev. J. B. Reade—You can print from them, but I have not one to show to the Meeting.

Those I have produced were taken yesterday—a day on which pictures could scarcely be taken ; but I was not aware, except at a very short notice, that I should be requested to bring the subject before the Society to-night. You may see from the pictures, that positives can be printed from them with perfect facility. You do not see any difference between the negative as it appears on this film and the negative as taken in the usual way upon collodion. There is, in fact no difference.

Perhaps I may be allowed, in addition to state, that when the film is of a certain degree of thinness, it has a tendency, wheu perfectly dry, to curl; but if you breathe upon it that tendency ceases, and it remains perfectly flat, and can be put into the priuting frame with the greatest facility. In takiug pictures you would adopt practically a useful thickness.

Mr. Foster.—May I ask Mr. Reade whether there was any difficulty, with the solutions of gutta percha, in making it from the ordinary gutta percha of the shops?

The Rev. J. B. Reade—Not any.

Mr. Foster.—The impurities fall to the bottom?

The Rev. J. B. Reade.—Just so.

I have used gutta percha for which I am indebted to my friend Mr. Williams.

It is very difficult to get the pure article, and fortunately it is not necessary; for when treated with benzole the impurities fall to the ground, leaving quite a thick browu sediment at the bottom of the bottle.

For the Photographic and Fine Art Journal.

THE SKY LIGHT.

Mr. Snelling—Dear Sir—Your kind invitation to write for the Art-Journal, I accept with much pleasure, and will endeavor occasionally to contribute my "mite," however humble it may be. I am, however, uot much accustomed to writing for the public, and especially for the "critic's eye." But neither the one or the other shall deter me whenever I feel so inclined. It will be enough for me to know, that what will stand the test of your judgment, will be likely to meet the general approbation.

Knowledge to be useful, must be imparted. And of knowledge, as of auy other *good*—it may be said, "It is more blessed to give than to receive." The great ocean itself is made up of rivers, streams, little fountains and rills. Thus we are all mutually dependent upon each other for what we receive and enjoy, and therefore should be ready to impart whatever of good we may possess to others.

Iu the perusal of your excellent Journal I recognise this noble principle, and I hope it will continue to be the predominatiug and master spirit that will ever characterise its future onward and useful career.

The subject to which I invite your attention, and others interested, is that of the *universal* practice of producing Daguerreotypes by au absolute *Sky-light*. I have in my practice found an insuperable objection in this method. The rays of light are too perpendicular. Oblique rays are more desirable, and truer. It is for the want of such au arrangement that the features of the face have the appearance of beiug melted and fused into each other, though to a certain exteut, this is desirable, in order to produce general harmouy and softness; yet the *subject* should be so placed, and the lights and shadows so distributed as to produce the strongest, or, iu other words, the most striking impression of each feature, without destroying their softness aud harmony. It is this that gives individuality and character to the human face, and throws around it that indescribable charm that elicits the well merited praise from the beholder while contemplating it—"It is beautiful!"

The reason heretofore given for the adoption of the sky-light is, that it affords proper light to the eyes, especially *light* eyes; but it is a mistake to suppose the eyes cannot be taken as well and as true to nature by any other light. An *artist* would not pretend to paint a *portrait* from a *sky-light*, such as is used by a Daguerrean. And who denies that the lights and shades of his pictures are the very best? Who can suggest to him an improvement? As we cannot hope to excel the *artist*, we should therefore study to follow his rules, if we would attain to that perfection we desire.

I do not pretend to give my opinion as authority, nor do I arrogate to myself the vanity of becoming a teacher; but my experience as a portrait painter for twenty years, and my practice in the daguerrean art for one-fifth of that time, during which I have paid particular attention to the nature and effect of light, entitles the suggestion to at least some consideration. I have studied the matter for myself, with a view solely to self improvement and pecuniary gain; but I am not selfish, and if others can be benefitted by my experience, I shall be happy to render all the aid in my power.

With regard then to the *proper light*, it should neither be a *sky-light* nor a *side-light*, but both judiciously *combined*, so as to fall obliquely upon the subject, say at an angle of about 45 degrees. This cau be effected by haviug an opening partly on the roof and partly on the side wall of the building to within six feet of the floor of the room. Such an openiug, would afford abundance of light for a group of any nnmber, and distribute the lights and shadows properly over the whole, the effect of which would be striking and rich. The light falling thus upon the eyes, do not destroy their beauty, but, on the contrary, gives a clear outline of the iris of the eye, and imparts a proper transparency and depth which cannot be obtained by an absolute *sky-light*, and so of all the other features.

And here I would remark, that this is all that is wanting iu the rapid and increasingly popular process of *Photography*; ouly give more *distinctness* of outline aud transparency to the eye; the painter then will have only to put the finishing touch, and that branch of the art will be perfect.

In conclusion, I would merely observe that portrait painters who are in the habit of paiuting from Daguerreotypes, will find pictures taken in the manner above recommended the very best for transferring upon canvass.

Yours, very respectfully,
C. H. Lanneau,
Dec. 11, 1855. Greenville, S. C.

For the Photographic & Fine Art Journal.

ONLY PRACTICALLY VALUABLE METHOD TO INCREASE THE INTENSITY OF A WEAK NEGATIVE.

Many different methods have already been published in England of attaining the results indicated in the heading. They all teud to produce some change more or less favorable to priuting by adding to the layer of oxide (?) or by merely darkening, or by changing the blue to a yellow color as a greater obstruction to the chemical action of light. Some of these methods are highly objectionable from the difficulty attending their use, and others from their liability to fade.

The hint thrown out by Mr. Hardwich in his valuable book on Photographic Chemistry, that the collodion picture could not be developed without the presence of free nitrate, led me to the method, which I intend now to communicate. I do not doubt that the same thing has been elsewhere already done, but having not yet seen it published I thought it worth while to do so.

Negatives intended for strengtheniug must be submitted to the most careful washing after fixing iu hyposulphite, as the least trace of this salt is likely to spoil a negative when again submitted to chemical action. After this has been attended to nothing else is required than that the surface be evenly wet, before pouriug on it enough developing solution to cover the plate, to which 6 or eight drops of a 50 grs. nitrate silver solution has been added. The solution has to be kept in motion on the plate and then washed off with pure water.

This operation can be repeated to obliteration of the picture.

This can certainly be called the only "legitimate" way of "strengthening a negative" as it is nothing else but a *gradual* continuation of the action commenced by the first application of the developing fluid.

Practical photographers are now all well aware that the right kind of a uegative is easy enough to produce with collodion (by only one operation of development) if certain conditions, taught to the professiou by experience and study, are complied with. But even to them the above is valuable, by enabling them to produce copies of Daguerreotypes that will print better positives than any negatives on albumenized glass, not to mention the saving of time and trouble.

Negative by Gabriel Harrison.

THE ANGEL'S VISIT.

I'm thy good angel, take thy brush, resume
Thy art, do not give up because the sun
Hath hid his face.

The above mentioned developing solution is nothing but the protosulphate of iron of the common strength with acetic and nitric acid, the last in the smallest proportion.

Osc. J. Wallis,
Cinciunati, Ohio.

For the Photographic and Fine Art Journal.

AMBROTYPE PATENT.

Gibbs *vs.* Simons.

Mr. Snelling—Dear Sir—I wrote you some time ago that I was making ambrotypes and cementing them between two glasses, and at the same time told you that I had uot been foolish enough to pay for a patent right. Since theu I received a notice from Gibbs, one of Mr. Cutting's victims, informing me that he would, through his lawyer, apply for an injunction on the following Tuesday. I heeded him not, but continued to make ambrotypes as usual. Tuesday came, and Mr. Gibbs was not ready, aud, for the same reasons, it was put off again and again until I was not williug to have it delayed any farther, and last Thursday it was argued at length before the Judge of the U. S. Court. His bill desired to restrain me from making ambrotypes and cementing them between two glasses. My answer was, that there was nothiug new or novel, in the patent, and, if the patent was good, that I did not use balsam, and, therefore, did not infringe his rights. You will be pleased to learn that the judge after having it in consideration for several days, decided in my favor by refusiug to grant the injunction. What will these patent men say to this? It is laughable to read their advertisements—" rights for sale to respectable operators"—meaning any one who would be williug to pay through the nose for them. Tell your patrons that they may all make ambrotypes. Let them use a varnish such as Mr. Anthony sells for negatives, and they will produce a much better effect thau can be produced with the balsam. If this varnish should be too thin, it can be thickeucd by evaporation, which can be readily doue by leaving the bottle uncorked and sitting it by the stove or in the sun for a few days until it becomes of the proper consistency.

Hoping that I have doue somethiug, however little, to break the chains that fettered this beautiful art,

I remain, yours truly,
M. P. Simons.

THE LAMPROTYPE.

New York, January 28th, 1856.

Mr. Snelling—Sir—Through the medium of your Art-Journal, permit me to present one useful improvement to the fraternity of picture makers of the United States, upon the collodion glass process, which will be found important to operators generally ; its simplicity and effect must be admired for giving fine brilliancy and intensity to the colors black and white, not produced in glass pictures generally. In fact, it is believed that this little or great improvement, as it may be termed, was first executed at Holmes' gallery of this city. Take your pictnre iu the ordiuary way, giviug it all the time it will bear, dry the plate perfectly, then apply a *fine dry* buff to the collodion silvered surface, polish it light and clean, setting the grain across the plate; this will take off the brown sombre look of the plate, and give you an intense, soft and clear texture of the picture not otherwise preseuted in the works of this beautiful art. Professors Clark, Gray, Sexton, Vau Beuren and Dutton of this gallery can testify to the utility of this improvement ; bnt, " as the proof of the puddiug, is in the eating of it," just try it on.

The pictures finished in this way, you must be convinced, will *surpass* those by the patent process, so called Ambrotypes. The title of the polished collodion portraits—" Lamprotypes"—was derived from the Greek word " Lampros" signifying, beautiful, rich, brilliant and decided. Yours, Respectfully,

Holmes.

For the Photographic and Fine Art Journal.

REALITY, IN A DREAM.—AN ALLEGORY.

BY GABRIEL HARRISON.
Author of " Lights and Shadows," Fiesco, &c., &c.

See Illustration.

'Twas one of those mysteriously beautiful and soothing autumn nights, when the guiltless soul becomes enamoured with all around it, when the pearl-white moon in romantic majesty walks o'er the dark blue heavens. The lazy pacing clouds with tattered silvery edges in fantastic shapes, glided onward across the broad expanse, and every motion of the soft air, that breathed its eloquent breath on the face of the guiltless (for only the guiltless can sip from the brim full cup of nature's loveliness) seemed like an angel with broad wings fauning the air and dispensing perfumes delicious.

Indeed, peace seemed to pervade all thiugs, animate and inanimate, man, tree, flower, bird and fish, even the faithful watch dog with his head to the grouud snuffed the air as if drinking in new life. The bat, with demon-like wings, as he cut his zig-zag pranks through the ambient air, in motion lettered on the sky, " catch me if you can."

The " now come" iu the playful boys " Hide and go seek" was mimicked above, echo sported with sound ; aud laughed with laugh, old age felt the lingeriug spark of life's electricity, in quickeued motiou course through his veius ; the winking stars appeared like huge diamouds sparkling in the soft moon-light, the silvery ripple of the moon-lit water, vied with the brilliancy above ; earth desported with heaven, uature was coutent, and her happiness seemed complete.

Such was this beauteous night, and of the many who beheld its charms there was not one who felt more inspired by its lovliness thau a young artist with sad heart aud a meditative cast of mind, who had wandered to his favorite haunt, a beautiful spot situated an the banks of the East river, about three miles from the smothering heart of the dusty " Empire City." This resort afforded indeed a luxurious feast for the vernal soul. It was on an elevation of some thirty feet, rising above the blue watery bed, aud overlookiug that broad and sometimes crowded aqueous thoroughfare. Trees, rocks, ruuuing vines, all were picturesque, and imparting such a charm to the surrounding scene as harmonized with the ambitious and melancholy cast of miud of the young artist, who had sought this, his thinking place; or rather the holy ground, where thought, unmolested, in her winged goldeu chariot, might enter at will any of her countless gorgeous palaces, e're dash into other worlds, the stars themselves, and revel in eternal bliss and day.

The figure of the young artist was tall, his face in expressiou pale and thoughtful, his eyes dark blue, his brow well marked, his curly locks blacker than the darkest shadow in night's blackest night, aud dreamingly beautiful. Upou the green earth he calmly stood, and with immovable gaze, feasted upon peerless nature.

The tall majestic oak, which reared its lofty branches o'er his head, was not more grand; and not more calm than he was the broad shadow which threw its crape over and arouud his stately form. His soul, however, soon lost its calmness, and struggling with its desires, thus found vent iu words :

Oh God, the Father of my being, and e'en
Of Nature's yonder pale and mellow moon,
And you, ye bright stars, like departed souls
That in ambient air are hovering now
The vigil night to keep, but nearer eome
To earthly home, and listen to my prayer.
Ye mountains too, ye stately oak, ye sweet
And little flowers around me, ye sea,
Ye light and darkness, wind and storm that rend
The roek, and ah ! ye heavenly ealm, that dost
Possess my soul and filleth me, oh God !
So full of Thee, to Ye I lift my voiee.
Censure me not Great God, these sealding tears
Rutling their deep way down my pallid eheeks
Do beg for my forgiveness, when my soul
Dares ask, *In greatness, make me next to Thee !*
Grant it, and as the lamb that bore the cross,
So meekly e'en will I my laurels wear.

My body asks for nought, I would not have
It dure beyond its greenful life, but for
My *name*; I ask for *all*, I'd have it speak
To man in breath eternal as *Thine own*
Have it pervade as *Thine*, The Sky, the Earth,
The drops of rain, snow-flake, the grain of sand,
Warbling of birds, the sighing of the winds,
The ocean's roar, the shadows dark and drear
That lie in solemn mass around the base
Of this descending deep and firm set hill,
And in whose darkest depths I read Thy name.
Oh, lift your voices, join with me, ye fields;
Forests with myriad leaved and whispering tongues,
Ye stones, and you ye slimy creeping things,
In supplication, wild and awful, raise
The cry until the earth shall tremble 'neath
The Thunder of your loud bewailings, start
The dead, affrighted from their narrow, cold
And clammy graves, beseeching God to grant
My prayer!

Having thus spoken, he stood motionless, as if expecting God himself to answer his wild appeal, in a voice as audible as his own, but silence was breathless. His heart failing him and apparently exhausted he sat down upon a gray stone lying at the side of the towering oak and the sea of his mind once more calmed; for his laboring bark of thought had but now

"Climbed hills of seas
Olympus-high; and duck'd again as low
As hell's from heaven."

In a few moments Morpheus waved over him his sceptre, and dreamland appeared. Years had rolled by, and in the meridian of his life he sat upon the log that had for many summers lain beneath the charred sill of the old cottage window, in his left hand, which hung by his side, were his pallette and brushes, emblems of that noble art which had held him slave through life. The landscape was peculiar in its effect.

The sweeping hill that gradually rose, blocking out the western horizon, had upon its sullen brow no object excepting only, three tall pines, which stood strangely erect and in dark mass relieved the pearly streak of light which stretched its death-like arm across the leaden western sky. Not the slightest vestige of culture could anywhere be seen, no bird, no being, except the artist, all was desolation, as if long since that awful day, the day of doom, had, with its flames of fire, passed over and charred the face of nature; the dingy cottage which stood upon the lower slope of the hill looked more like the home of the wild bird of the heath, or like the raven's lodge, just fit to hold his midnight croakings in, and sing his dismal song of ill-luck. Every object wore a barren aspect and harmonized with the sad appearance of the poor artist who with his elbow resting upon the old window-sill and his forefinger pressing against his temple as if helping thought to think. Not to conceive of a design nor compose a grand epic for the cartoon, nor spread upon the pallette of his mind a delicate tint to embue flesh, and make it move upon the canvass; no, far different were his thoughts, which were as curses to him—thoughts that lifted the curtain of the past and showed him an immense field of labor—a field he had carefully sown with the seeds of industry; and in the rich soil of genius, too; but a blight had passed over it, yielding a harvest blackened, instead of being tipped with the golden ripe of grain; his products of the present were *weeds*, not wheat, and his future, how dreadful! for hope within him had died, that ever-enticing star of life had gone down, and no light was left to cheer his dreary way. *Disappointment* had placed her out-reaching, long thin, pestilential fingers on all his works and expectations, and blackened and seared his heart, when it should have been rubious and blithesome; and yet his works were good, and so also was his *soul*. He saw God in everything, so tender was his heart, so exceedingly sensitive were his passions, that he even felt for the inanimate; a rusty nail, in his opinion had being, and he would hide it from the winter's frost, for fear of its suffering, the half withered flower thrown by a ruthless hand upon the road-side to be trampled on, and desecrated in the dust; with eagerness he would snatch up, and give it drink in his choicest cup, wipe the dust from its bruised leaves, inhale its lingering fragrance, and kiss its fast fading but still blushing cheek. What are deemed loathsome things, were not loathsome to him; the worm had his pity; he would turn back and place it far from footstep's danger, and he would rather sit in the dark, than the miller should scorch his snow-white wings in the dim-taper burning, and he knew that whatever *God* thought worth making, by *Man* was worth guarding.

Such was the heart of this poor artist, which misfortune had made her companion, while others, reckless, debased, unfeeling and ungodly, with not half his genius for art and its world of inspirations, were ever prosperous; no blight, all sunshine and content, Can Plutus have eyes! to lavish his choicest bounties on such? Oh *justice* stand by *fame* in the future, and help that God of memory, to *fade* the laurels of the *unrighteous* and *freshen* the *evergreens* of the *true* and *merciful*.

With such a perfect nature how harrowing it must have been to his feelings to read the past and contemplate the future, no consolation was there for him, no, not even from his wife, who sat within the cottage in sadness as deep and brooding as her lord's without. The elder of her two sweet children had just now looked up into her face and asked for bread; the word was worse than death to the truly delicate heart of the artist, who was at the time fully absorbed in the progress of a painting which was as dear to him as were his eyes. Startled, paralized, he could work no longer, he left his humble studio and sought relief where we have found him, at his cottage door. In this situation with low and plaintive tones he spake to himself thus:

'Tis done, and all is o'er; yes, all is past,
For fate has plac'd her dark and damning seal
Of blighting chill on all; to me the night
Of life has come, before its day had dawn'd,
For since my youth, its first impulse of strange
Ambition felt, I've striven to bring forth
From hidden caves of thought, the good, the bright
And moral thinking that should long e'er this
Have given me plenty, and my name a place
Among the glorious and permanent
Things of earth; but what has been my boon?
Within my cottage there, my wife and child
With voice so plaintive ask for bread, that life
Becomes a pang, my blood grows cold, and yet
I've nought to give, no friend no where to 'tain.
My works with spiders' web are covered, works
By best of judges said to be of high
And glowing merit, now in corners dark
And damp, decay, and go to ruin. Oh!
Fruitless, returnless toil, why should life's cup
From which I sip, be ever filled with wo.
And disappointment? while the trash, the daubs,
Of fameless painters, puffed and hawked about
By would-be connoisseurs, as gems of art
Their prices bring, to make the rich still more
Rich, and the poor unnoticed artist still
Poorer. Did Fate attend the onward steps
Of Claude, Lorraine, Murrillo and Van Dyck
At art's ennobling shrine, with meed alike
Blasting, uncheering, cold, and sick'ning drear?
Indeed, if so, I'll work no more, I'll dash
To earth my paints and all that art doth claim
As hers, and lay me here to die.

At the conclusion of this speech, unconsciously a tear pearled his eye, and yet the expression of his face was unfeeling and seemed to denote utter disgust for all in life, except the flowers of his heart, his wife and babes within the cottage. Motionless, almost like a statue he sat, and would, perhaps, have remained so for hours, had not the hand in which he held the pallette, relaxed, and the pallette by falling to the ground startled him from his wakeful dreaminess. Gently he turned his head to where it had fallen, and inaudibly said:

Well, 'tis
Best, yes, lie e'en thee there, no more wilt thou
Grieve me, no, I will leave the world in which
I've revelled, and paint no more. Adieu.

Unknown and unseen, now an angel descended and spake thus to him:

"Never despair, paint on."

This was said so mildly and faintly, that the artist himself thought for a moment it was merely the whispering of his own thoughts, but it was repeated in louder tones

"Never despair,"

Too audible was the sound, and lifting his head he looked to

the right, when lo! there stood before him a beauteous angel, in form palpable as his own, with snow white wings, the top curves of which went far above the angel's head, and their tip ends touched the ground. Oh, they were beauteous! not a spot sullied their whiteness; in strength they seemed indeed as if made to bear the indescribable form they adorned through measureless space to that sphere where only such forms dwell, "The kingdom to come."

The flowing robes and mild deportment of the angel touched the earth so gently, that unexpected as was such a strange yet transcendently beautiful spirit, the artist was not in the least startled, but peering directly at her, with his hand he brushed the atmosphere aside as if striving to remove an illusion; but no!—'twas there, too real to be doubted, and yet he doubted, and in lowly voice the artist spake to him doubting as he did, saying these words:

" Speak if thou art what thou
Seem'st—real, if thou hast voice, I'd hear again,
'To make assurance doubly sure' that thou
Art what thou art, and not a devil plum'd
To tempt me while in my shadowy mood,
And drag me from the right to wrong."

For a moment there was a pause—the artist calmly awaited the reply, and soon a smile lighted up the angel's face, and from her lips these words fell gentle as the dew from heaven:

Artist!
I'm thy good angel, take thy brush, resume
Thine art, do not give up because the sun
Hath hid his face. 'Tis when the thunder rolls
That earth the deepest drinks, and yields the most
And smiles the more; the little blade of grass
That's beaten down, still lifts its head amid
The storm, and thrives on; yes, and lives to kiss
The breeze and nod its top in wanton sport
With many a morning bright and warm."

While the angel was speaking this wholesome allegorical truth, the artist seemed to catch each word with wonder, and apparently still doubting the possiblity of the angel's presence, although he heard her voice and beheld the motion of his lips, and the movement of his hand when raised, while speaking of the sun, still he was restless and looked from himself to the angel, then placing his fingers on his own pulse as if to realize and recognise still more his own presence, he spake again to the celestial being:

" As sure as life's within these veins thou'rt there!
Angel, may I with thee, dare hold converse?

The angel smiled and answered:

"I'm here to cheer thee: Yes.

This prompt and mild reply of the angel still more confused the artist, and for a spell he seemed as if preparing his mind to speak. At last he broke the silence and began thus:

" You say paint on,
'Never despair.' What have I done—Consult
The past. See what Record can say of my
Devotion, love and toil for art, I pray
Thee ask the owl, midnight's companion, that
Hath set upon my chimney top, where he
Has found me oft! Could he but speak to thee
He'd say 'at work.' And ask the morning lark,
The first to greet the dim crepuscullar;
The day's first glimmer, slyly creeping o'er
The world's far eastern slope, he, too, would say
'With easel at his side, and pale upon
His brow,' does not my wasted form, tell what
I have been doing. No, good spirit, tell
Me not "resume."

In answer, the angel said,

" What! not resume? and wouldst thou indeed
Desert thine idol, that so long thou hast
Followed, because a passing cloud hath dimm'd
Thy way? In this thy storm of life pursue
With cheerful heart thy purpose. O! let not
Thy pasts pale light be unto thee a ghost
Standing like animated death, beheld
In future's path to frighten thee aback.
No, follow me, the way though dark and drear,
Still darker than the past and full of strange
Temptations, yet pursued will end where gates
Of golden hue will ope' to life as pure
As golden purity."

The angel at the conclusion of this simple and persuasive speech, partly turned to the east, and with outstretched arm and pointing finger indicated the way he would take, and said:

" Follow, our way
Is to the east.

And as he now spake he lifted his great white wings, expanding them in the air as if about to depart for his celestial home. The sound of their motion was like the flapping of an unfurling sail, and as they spread, they lifted from his breast his ringlet locks, that rested there in heavy mass, throwing them in graceful form across his shoulders. The artist fearing that indeed the angel was about to leave him forever unless he immediately resolved to follow, seemed somewhat to revive, and after taking up his pallette which had fallen to the earth, stood firmly erect, apparently determined to follow the unearthly being no matter to what end, and said:

" Lead on, I'll follow thee."

The angel answered not, but turned and went his way, the artist following down over the sloping hill that led from the cottage, till they came to what was once a stream of pellucid and sprightly water, bathing the feet of this cottage-capped hill, which in its glidings had many a time sang its ripple song, and playfully wet the willow's bow, when nodding beneath the summer's breeze to kiss its mirroring face—but now all was changed; the sapless trunk of the willow stood stripped of its waving drapery, a skeleton only of what it once was. The banks on either side were dried and parched as crust, not a spear of grass or a vestage of one could be seen, no little yellow butter-cup, earth's spangles, to make merry earth's face; no water-lily nodding and plumbing water's wave, was there—all! all gone, all changed and instead of limpid water, there lay before them a thick green scum, ugly and nauseating to look at; along the edge of this pool they passed, the way gradually growing more rugged, and the angel leading as if in search of a place of crossing. At last they came to such a place, and there appeared in this filthy stream some few rocks and a log; just visible above its stagnant surface and partly covered with slippery slime. Here and there could be seen resting upon the rocks, abhorred toads, with swollen throats and eyes almost starting from their sockets as if bursting with spleen and choaking for utterance, snakes were there too, twisted around the log, with their leaden hued lengths and tinsely greenish spots, out-stretched heads, gaping mouths and pointing stings, apparently greedy to kill or poison all that should attempt to pass that way.

Difficult and horrible as it seemed to cross this detestable place, yet the angel passed over without impediment like a vapor before a morning breeze, and on the opposite bank in calmness stood awaiting the artist, who, like a statue seemed motionless, daring not to venture for fear of being stung or immersed in this sickening slime that extended to the left as far as the eye could reach and to the right it lazily wandered in among the distant wild hills spotted with tall dark pines and dumpy bushes; the sky overhead, and beyond the hills, still wore a sable hue. Like a faded pall it overspread the broad canopy of heaven and appeared like a reflection of earth's own sad and desolate face, the stillness, too, was fearful, not one faint breath of wind to stir the few red and crispy leaves that lay upon the ground like sad tokens of a summer past and gone, not a ray of sunlight to brighten earth's melancholy face, or with heaven's beam paint a hope to cheer the poor artist's heart; at length the silence was broken and so low was the artists voice that had not the stillness pervaded, the artist had not been heard, and his words were:

"I cannot cross this place: look on those rocks,
My feet would slip, besides those snakes would sting
Me unto death; what may this mean? is there
No other place to cross? Without this risk
Without this filth, without these toads and snakes"?
" No other place,"

Was the prompt reply of the angel, and he continued:

" This stream is endless, on
It leads as you may see from north to south
And this the only spot where stone or log
Will lend thy feet a resting place, dispair

Not, but hope yet, try ever; thy reward
Awaits thee."

Alluring words, "hope yet," "reward" the sinking heart of the artist revived, treading sure, and as he stepped from stone to stone, and from stone to log, the toads as if by magic power fell from the rocks, the snakes rolled from the log, and the slime crept from beneath his feet leaving the passage clear, and in a moment he 'stood beside the angel, who greeted him with a smile and would have spoken, but the artist exclaimed "Eureka" and looked with amazement upon what he had done, for there they were as before he crossed the pool, the rocks still with slime and toads, and the log with snakes, and he se-cure,

"What may this mean?"

The artist asked,

"Untainted!
Unstung! I stand before thee, speak! Explain!
"I will."

The angel answered, and thus explained:

"Two lessons thou canst read, the one
Of God, and one of man; the one of God
That tho' through life, besetting sin's around
Thee (aye and all,) and touching it is more
Filthy than this dark pool, yet thou and all
Can 'scape by simply trying as thou hast
In passing over here.
Of man, these toads
And snakes resemble, ever in the way
Of Genius or God's advancing child
To stay his march to fame's bright mount, and with
Their sting of jealousy and venom stand
Ready to hiss and strike thee down, or with
Conceit swelled up would dare dispute thy way
And worth; but fear thou needst not have, for such
Are like a fleeting flake of snow, e'en melts
And are no more."

As the words "No more" were dying on the angel's lips, the artist spake with ardor and the reaction of blood mounted to his manly face, and for a moment robbed it of its pale intellec-tual charm, and said:

"I comprehend, and read
My lesson in the brook, my blood's a glow
And now I'll follow thee even to death."
"Even to death,"

The angel repeated, and with a smile; he shook his head and spoke:

"Oh! no, not unto death!
For he that follows his good angel will
Reach *everlasting life.* 'Tis well that thus
You brighten in the face and gather strength
By walking where I walk, but do not think
All of your troubles past, we only find
That fire doth pure the melting gold, and so
The soul is found, and God can only judge
By scorching trial here.
Come gather all
The strength you can—for mark, the way that lies
Before is long, and filled with thorns, but if
You follow, passing all that tempts, and pause
Not to o'erleap the gulph (of sin I mean)
Lying in life's progressing way, the boon
You ask, "The being next to God" shall be
Thine."
Mine?

The startled artist said,

"Yes thine."

The angel answered, and turned to go, but the artist interro-gated again and in ecstasy exclaimed:

"Oh stay and let me thank thee
For now my soul is filling with delight!
Joy I have felt before, but none was like
To this!
I've stood upon the mountain top and seen
The black and fleeting thunder cloud rise up,
Yes: blotting out horizon, hills and all,
On it came steady paced, uprooting trees
And lev'lling hills, around the stoutly oak
The streamed lightning twisted lived wreaths,
Of blinding fire, to earth it dashed and made
A gape, like hell, that melted stones and belch'd
A smoke of sulph'rous smell and hue the mount
Whereon I stood, was shaken, and seem'd to fear
Its own destruction, yet I stood and smiled
For I was joy'd to see my God at work
And wish'd to do like him; yes, angel dear,
I've wandered in the groves, just as the sun
Was dressing earth in mantle light, and drops
Of trembling dew bedecked the flowers, and all
Like pearls a blushing in vermillion glow;
The birds, too, sang their matin song, and leapt
From bush to tree, that gladen'd heart and soul,
But not more glad, as when you said, "It shall
Be thine" the being next to God."

The angel was now moving on, and all he said in answer was:

"Enthusiastic?"

"Yes, 'ist wrong?"

And the angel auswered again:

Oh, no 'tis nature's fire undimmed, and
When in man, it burns less bright, no more can he
Expect to *see* and *feel* and *mount*, as God
Would have him mount; and they who speak against
This warmth of soul, are *ice* in *thought*, in *act*
And *end*, or like a tree with not enough
Of sap, 'tis scant in leaf, in blossom less
And fruitless.

Now there was a long pause, and not a word was said by either angel or artist, but steadily they pursued their way for hours as if day had no night, but all the while as they passed along, the scene was changing, the path grew more rugged and embarrissing to the artist, the ruddy suffuse of mercurial action that had but now been brought to play by tricky hope, and purpling over the cheek of the artist had disappeared like a morn-ing beam, and his face was as pale as before. Strengthless, and still more strengthless became his step, his meagre expres-sion denoted physical exhaustion and inability to pursue much further his toilsome and seemingly endless journey, at last lag-ging he stopped and said:

"I'll rest."
"No time to loose,"

The angel answered:

"The mist you see,
That now encircles the distant hills and seems
E'en like a cloud from heaven falling fast,
Will o'ertake us before we reach a point
That must be gained ere day puts out her light;
And this, thy precious moment lost, is lost
To thee forever, come on!"
"Well, I'll try."

Was all the artist said and on they went.

(To be Continued.)

Personal & Art Intelligence.

— With the present number we enter upon our Ninth Volume, and we are pleased to say with prospects—so far as increased circulation is con-cerned—brighter than at any former period. The events of the year that has just passed have not been entirely satisfactory to us, as we have not been able to meet our engagements in the different departments of the Journal in a prompt or perfect manner. Although the causes have been entirely beyond our control, we cannot help sincerely regretting that anything should have occurred to prevent our attaining that standard of excellence at which we aimed. When we issued our prospectus for the eighth volume, we thought we had made such arrangements with the various eminent Photographers of our country as to avoid any disappoint-ments in the production of our Photographic illustrations; but we were most grieviously in error. Each month had been appropriated to one of the several gentlemen who engaged to furnish illustrations. Those who did furnish them were invariably behind time, and those who did not, in-formed us of their inability to do so at the last moment, when it was en-tirely impracticable to obtain them elsewhere.

Previous to our leaving the city last summer, we engaged a gentleman whose time was not so entirely occupied in the *business* of portrait taking, to print the illustrations for September and the two following months, so that, in case those who had before promised to fill these months should fail to do so, we should have a certainty, at least for the three remaining months of the year. A portion, only, of the September and October illus-trations however, were printed, and the contract then relinquished on account of more pressing business. It was not until the 25th of October that we were informed that the November and December illustrations

would not be forthcoming. The only course that now remained to us was the fitting up of a printing room and the engagement of a suitable person to do our printing. The first we easily accomplished, but to find one competent to undertake the manipulation was out of the question; we were therefore obliged to select a lady entirely unacquainted with the art and teach her. So far as talent and taste for the art is concerned, we were very fortunate in our selection, and under ordinary circumstances we should have been enabled to issue our last number with very fair photographs, but as we could not control the elements, we were obliged to submit to day after day of gloomy, foggy or rainy weather for over three months; added to this the negatives furnished were not of the best, and the consequence is before our subscribers. After delaying our November and December numbers far beyond the day of publication, we were under the necessity of sending them off unillustrated. The first week of the present month was also unpropitious for obtaining good positives; but the illustrations with which we present our readers are about on an average with those furnished by others, and we feel confident that a very few weeks more will enable us to produce pictures superior to any we have heretofore given. When once fairly under way, it is our intention to vary the formulas for printing, and to give these formulas with the description of the photograph, in order that our readers may judge of the respective merits of each.

We have considered it necessary to give this brief explanation of the causes of the delays and disappointments that have met our endeavors to satisfy the expectations of our subscribers, in consequence of the innumerable letters we have received on the subject, as well as to vindicate ourselves from the erroneous impressions as to the same, that have been given by interested parties. What man *can* do to accomplish the expectations of the friends of the Photographic & Fine Art Journal we *will* do. No exertion shall be spared in making it what we destined it to be at the start. Those only who have had experience in the publication of such a work can realise all the vexations and troubles that attend its issue. In this case those vexations are increased by the disappointments caused by some of its best friends. We know that this is not intentional; but that fact does not mend the matter. Every one who pays his money for the Journal *must* desire to see it perfect in all its parts, yet he wilfully forgets that that perfection in a measure depends upon himself—that money alone is not the grand first principle of that perfection—that mind also must be brought into action, and that in "the multitude of counsel there is wisdom."

We shall do all that our feeble powers will permit towards the advancement of the Photographic Art; we shall be unwearied in our exertions to build it upon a solid foundation, and to increase its influence; but what can we do alone, compared with what may be done were the genuine persevering lovers of the Art to place their shoulders to the wheel along with us? We almost despair, however, of bringing the members of the Photographic Art in this country to a sense of their true interests, or to instil into their breasts that manliness of feeling, that true principle of benevolence and nobleness that characterizes those of Europe. Yet we will strive on—the meaner sentiment of selfish agrandizement that is the bane of the Art in this country may in time be overcome, and we may yet see a more manly and liberal spirit take its place. Our readers must pardon us for this severity of language, but we cannot conduct our Journal with justice unless we speak the truth, no matter how hard it may fall upon unwilling ears. Those to whom it cannot apply will not condemn us, and those whom it causes to wince must correct their errors.

Our readers may depend upon it we shall always endeavor to conduct this Journal with all the impartiality that it is possible for poor erring humanity to do, and if we seem at times to be severe, they must place it to the account of a true desire to see the Art elevated to the highest point.

We have some very important facts in preparation that will be of more than ordinary interest to every Photographer in the country; facts that we have no doubt will create intense excitement, and we should not wonder if some very celebrated men were made to feel ashamed of themselves.

— We have been shown some of the most beautiful results of the Photographic Art we have ever yet seen—almost realizing the desired expectation of the Hillotype; in fact if that alleged discovery is even equal to this, nothing but sheer madness could cause the delay that has occurred in its introduction to the public. Those who have paid their hundreds for Ambrotype *patents* will live to see their folly. We do not wish to forestall the announcement of the discoverer by saying more at this time, but we are in hopes that we shall be permitted in our next issue to describe the improvement and announce the terms upon which it will be disposed of to the photographer.

— L. W. Keen. Since we wrote you we have consulted Mr. Mascher, and we have received the following note in reply:—

Philadelphia, *January* 20, 1856.

Mr. Snelling—Dear Sir—In answer to your inquiries, I would inform you, that Mr. Joseph Thomas of Owensboro, Ky., owns the patent right for Stereoscopic Daguerreotype Cases for Davies' County, Ky. And Mr. John C. Spencer & Co., Merchants of Murfreesboro, own Rutherford Co., Tenn.; Mr. T. J. Bailey of Columbia, Maury Co., and Mr. P. C. M'Cowat of Jackson, Madison County, Tenn.

All the above named gentlemen have the exclusive right to use, but not to make the cases in their respective counties, and my cases can be used by any person in the United States, except in the above named counties. The right to manufacture is vested entirely in myself,

Yours, very Respectfully,

John F. Mascher.

We had been given to understand that Mr. Mascher had re-purchased all the right he had sold; but he informed us in a recent interview that he had been unable to make any arraugement with the above gentlemen.

— John W. Eccles.—We consider it fully worth the money, but so few can work from mere formulas that you had best write for full instructions in MSS. Many others would have saved the like amount had they been as wise as yourself. Three months from this they will all wish they had taken our advice.

— Webster & Bro.—Your Photographs for the members of the Exchange Club have been received. You are making decided improvement. Do not silver your sheets so long before printing. We announce the addition to the list of members of P. E. C. every month in order that all may know how many pictures to print. There are now but twenty-nine members. The objection you make to the rule of expelling members is just in the sense you take it—but it is only intended to apply to those who are habitually delinquent from neglect and not from necessity. We can tell you better in about one month how many perfect photographs can be printed in a day and then you can better judge whether the rule is too arbitrary. Of course it can be modified by a vote; the proposition for which can be made through the Journal by any member. The promised negatives will be very acceptable, as also the communication.

— J. F. Rider.—You must not think us negligent regarding your request. We sent repeatedly for the article, and, although promised, it has not yet been furnished. We have seen a small sample recently, of a new article, that on trial proved very fine. As soon as a quantity is made we will send sample.

— W. R. Lawrence—We did not get your letter of Nov. 20th, until six weeks after date. Hence the reason of your getting no reply. The P. O. rule could not well apply in any case to our Journal, as we stitch in every sheet—at least such was our instructions. Your expressions of interest are indeed flattering and we shall always try to deserve them. You have my deepest sympathy in your protracted illness, and best wishes for speedy recovery. The charge will be $3.

— J. Vannerson.—It is better to send all from the same negative. The name of a member should be written upon the back of each photograph to facilitate the distribution, otherwise some may be missed and others receive duplicates. Mr. Vannerson proposes that the photographs should be sent unmounted. The members of the P. E. Club will please indicate their pleasure on this point.

— Willard & Depew.—These gentlemen have purchased the Gallery of J. S. Woodbridge, Columbus, Ga., who speaks in the highest terms of their ability as Daguerreotypists.

— R. H. Vance—Still maintains pre-eminence as the first Daguerrean in San Francisco, Cal. He has lately introduced the paper process into his establishment and the specimens sent us give promise of the same high excellence in this branch that he has attained in the daguerreotype. A little more attention to the negative is all that is required. A good negative is all important in producing fine photographs. We find a bluish black in the shadows to be the best; a clearer positive is the result, no matter how light or dark they are printed.

— B. Betts.—We hope you will reconsider your resolve. You will

only have to furnish twenty-nine and that probably will be the extent for some months to come.

— M. P. Simons.—This gentleman has come off with flying colors in his suit with Mr. Cutting's patentee at Richmond, Va., the suit having been decided against the latter. Mr. Simons uses two glasses in putting up his Ambrotype pictures cemented with a varnish, which he says is decidedly better than balsam, as it is not so apt to blister and change color.

— A. Hesler.—We clip the following from the Chicago *Pathfinder*. Mr. Hesler deserves all—and more—the praise awarded him.

Hesler's Gallery.—This institution (for it is really such) has now been in operation about a year. Upwards of twenty thousand dollars have been expended in fitting it up, and it is acknowledged by all to be the most perfect, the most costly and the most attractive Photographic Gallery in the United States, perhaps in the world. Few men are more unassuming, *none* more sociable, and none have been more successful than the soul of that gallery, Mr. Hesler. The "Register" shows that since the gallery was opened, an incredible number from all parts of the world have wandered through it; and the many remarks appended to the names at once points out the fact that perfect astonishment at finding such an establishment in the far West was the prevailing impression. No visitor to the West should allow any circumstance to rob them of the pleasure of a visit. Every specimen that the art can furnish will be found here in perfection. The number of Western scenes, true as nature, alone forms a large collection, and is worth a long journey to see them. Let every traveler visit the gallery; as to securing a picture from this great establishment he can easily decide that when he gets there.

— Mechanics Institute Fair, Louisville, Ky.—We find the following notice of the pictures in this fair in the *Daily Courier*.

THE PICTURE GALLERY

Is really the attractive feature, and although our Artists have not so fully represented the various branches of this department as they should, still the few who have done so, have done it nobly. Webster & Brother are fully represented, and no other department attracts so much admiration as their beautiful display of Daguerreotypes and Photographs. The former excel in warmth of tone, bold and clear delineation, and a remarkable roundness which seems to detach the subject from the plate. This latter quality struck us more forcibly in the large heads in which it is much more difficult to obtain this effect. We also noticed a very unique style of Daguerreotype called the "Crayon" or "Viguette" style. This seems to us a very appropriate and tasteful style for pins, medallions, and all kinds of ornaments. Among the plain Photographs we notice many of our most eminent men and beautiful ladies, and although this style of picture is not in favor among the latter, still we must say that the lady who can bear to be robbed of animation and color, and still be beautiful, must be beautiful indeed; and when we say that many of these pictures are exquisite, we say just what we mean, for who that can admire a fine engraving will not be struck with the wonderful resemblance which Websters' Photographs bear to steel-plate engraving. Indeed, we had never supposed it possible that such delicacy of shadow, together with soft and clear delineation could be produced upon paper; silk, satin, cloth, &c., of every conceivable style and texture, is vividly represented. We notice also that these pictures are free from the reddish or rusty tone which marrs the beauty of the first Photographs.

But it is in the display of colored Photographs that we feel the deepest interest. Here we have combined efforts of the Photographer and the Artist. With an ingenious combination of lenses, the former throws the image upon a chemically prepared paper or canvass, which, when fixed, represents his subject with a never-failing truthfulness unattainable by any other means. When this picture is put into the hands of a competent artist, and colored up to life, the result is a portrait which it is impossible to surpass; and such an one is the likeness of Hon. Presley Ewing, colored in oil, life size: also the half-length portrait of a lady in Pastel colors, (this is the most exquisitely wrought picture we have ever seen; also the extra cabinet size portrait of a lady in the same style of coloring; the beautiful full length, miniture size picture of a lady in water colors; the cabinet size pictures in oil; the colored Ambrotypes on glass are all perfect gems of art. Next comes

TROXEL'S DISPLAY OF AMBROTYPES.

This is a comparatively (to us) new style of picture. They are taken on glass and have this advantage over the Daguerreotype—they are free from the glare which a polished metal plate must necessarily have, and consequently can be seen in any light; they are said to be permanent, but however this may be, one thing is certain, they are a most beatiful style of picture and add much to the interest of the Exhibition, and Mr. Troxel is entitled to much credit for the taste displayed in his exposition.

— F. Langenheim—Devotes himself almost exclusively to stereoscopic pictures, and we take pleasure in having it in our power to say that his colored glass views are of the most exquisite character. The lover of this beautiful style of picture can find nothing that will give him greater satisfaction than the views of American scenery taken by Mr. Langenheim.

— M. A. Root has associated Mr. G. S. Cook of Charleston, S. C. with him under the firm of M. A. Root & Co. The well earned reputation of these gentlemen can gain nothing from what we can say of them. Their works speak for them most emphatically. Dr. G. Langdell has charge of the Photographic department and has acquitted himself in the most marked manner. There is a charm about his pictures that cannot be produced by any except a true artist. There is a clearness, brightness and life-like expression in every lineament—the eye especially rivets the attention at once. They are the nearest approach to pencil drawings we have seen produced by photography.

— White, Montpelier, Vt.—We have received from this artist several photographs of decided merit. He has improved rapidly since he commenced the paper process. One picture—a view in the mountains with a team of cattle in the foreground is very good. He excels in landscapes, the foliage being very fine in detail.

— Justice though slow, is always Sure.—In the hurry of getting out the premiums at the late Fair of the American Institute, the award upon finely-finished Photographs was accidently omitted. The prize in this department—a gold medal—was awarded to Samuel Root of No. 363 Broadway, whose prize pictures were by far the finest ever seen in the country. Mr. Root has within a few years received about a dozen medals for proficiency in various branches of his art.

— Microscopic Photographs.—Some microscopic photographs exhibited at Manchester, England, have excited much admiration. One, of the size of a pin's head, when magnified several hundred times, was seen to contain a group of seven portraits of members of the artist's family, the likenesses being admirably distinct. Another microscopic photograph, of still less size, represented a mural tablet, erected to the memory of Wm. Sturgeon, the electrician. This little table covered only one nine hundredth part of a superficial inch, and contained 680 letters, every one of which could be distinctly seen by the aid of the microscope.

— Our friends Knecht & Thompson of Easton, Pa., are having rather a spicy set too in the papers, on the merits of their respective Ambrotype processes. Knecht has the "patent" and Thompson the "improved" process, and with them they both take good pictures, but we do not think they will make anything by calling each other hard names. The processes used by the gentlemen are the same in all things except the method of sealing, and there is no choice in fact as to their value.

— Gallery of Female Beauty.—The extraordinary and ingenious Gallery of American Female Beauty, gotten up by Mr. P. T. Barnum, is now in "full tide of successful experiment." Most of the leading daguerrean artists in the United States are taking pictures of the beautiful women in their vicinities, in amicable rivalry as to who shall win the silver cup, &c., to be bestowed upon the artists who may be sucessful in executing the likeness fortunate enough to secure the great prizes of beauty in this unique enterprize. As all the likenesses of the ladies are taken *free of expense to the sitters*, we advise every gentleman who has a handsome wife, sister or sweetheart, to be on the *qui vive* for the honors!

J. H. Fitzgibbon.—This gentleman paid us a flying visit during the past month and exhibited to us some specimens of colored photographs. They were well painted, touched with an artist hand, but the coloring was rather too gaudy to please us entirely, although the style is generally admired and not inartistic.

— C. Guillou, Esq.—This amateur photographer has presented us with some very fine views of scenery in and around Philadelphia. The portraits are also very fine—much superior to those of many of our professional artists.

— Minnis & Tanner.—In noticing this firm in our last issue, we erroneously printed the latter name Turner.

— Mr. A. A. Turner having concluded his engagement with Messrs. Gurney & Fredericks, designs making a tour of the United States for the purpose of giving instructions in the Photographic art, including his process for making photographs on canvas of any size. As he intends leaving this country shortly, those who wish to avail themselves of his experience can do so by addressing him, immediately, to our care.

— Ambrotype.—We call attention to our advertisement of a work on this style of photographs, by M. A. Root, Esq., which we have in press. This work will embrace a complete practical treatise of the art, together with a full history and exposé of photographic patents in the UnitedStates. The name of the author is a sufficient guarantee that its merits will be of the highest order. As we are determined that our photographers shall not be imposed upon by exhorbitant prices, we have placed the price at 50 cents and we will warrant it superior to any $5 work.

— We trust our subscribers will be more punctual in their remittances this year than they were last.

ALBERT G. PARK.

Negative by himself.

From Notes & Queries.

ON A CONCAVE FIELD FOR PHOTOGRAPHIC PICTURES.

BY HENRY BOWMAN.

HAVING long been an ardent admirer, though to a limited extent a practitioner, of the fascinating and important art of photography, I have thought it well deserving any consideration and study which may tend to advance it towards perfection; and with this view, I beg to send a description of a contrivance which may, perhaps, be considered as of importance.

All photographs hitherto produced, notwithstanding their general beauty aud excellence, are yet defective in one particular, viz. the comparitive indistinctness at the margins of the picture. This arises from the spherical distortion of the lenses, by reason of which the foci of the pencils of rays, from the different points of the objects represented in the picture, do not arrange themselves in a *plane*, but in a *concave* surface; the central rays (passing in or near the axis of the lens) being brought to a focus at a greater distance from the plane of the lens than those which pass through it more obliquely, aud form the margins of the picture. The amount of this defect varies according to the quality of the lens, and though sometimes reduced so far as to be almost imperceptible, yet this result can ouly be attained either by the use of large and expensive lenses, or by unduly curtailing the size of the picture.

As therefore the foci of rays from all points (which together form the picture) cauuot be made to fall strictly on a *plane* surface, the object of the following contrivance is so to adapt the receiving surface that all these foci may fall upon it, and thus produce approximately, if not absolutely, a picture of equal distinctness throughout.

The degree of concavity will vary of course with the forms and different combinations of lenses, and must be determined in each case by experiment. What the mathematical nature of the surface may be I am not aware, but practically it may, without risk of appreciable error, be taken as a portiou of a sphere.

Now the substitution of this concave for the plane surface is exceedingly simple. A wood frame is made to slide into the groove of the camera in the ordiuary way, with a projection all round to receive the edge of the plate which is to support the sensitive paper. This plate consists of a sheet of gutta percha, the full size of the interior of the frame, bent to the proper curve, and sufficiently thick to retain its shape. The segmental spaces between the margins of the plate and the wood frame are filled in solid, and a rebate cut all round to receive the projection in the frame. A bar or strap is fixed behind to keep the plate firmly in its place; or the gutta percha plate may, if desired, be permanently attached to the wood frame. A shutter slides in front in the usual way.

The degree of curvature to be given to the plate is easily obtained by first ascertaining the difference of focal length between the centre and corners of the picture on the ordinary flat focusing glass, thus;—first get a perfect focus in the centre, and mark the projection of the lens from the front of the camera on the brass slide; then slide the lens in until the focus is perfect at the corners, and mark this also; the distance between the two marks on the brass slide will be the difference of focal length required. Then on a piece of cardbord draw a straight liue equal in length to the diagonal of the focusing glass, and opposite the middle of it make a mark at a distance equal to the difference of foeal lengths as above determined. Through this poiut and the two extremities of the straight line draw a segment of a circle, and cnt the cardboard through neatly with a knife along the line of this segment. Next, procure a convex surface of sufficient size, of either glass or polished metal, whose curvature coincides with that of the concave portion of the cardboard; and haviug softeued the gutta percha by dipping it in hot water, apply it quickly to the convex surface, and keep it iu close contact till quite cold and hard. It is then cut to the exact size, and the segmental spaces nnder the margin filled in with the same material, so as to give an even bearing all round on the wood frame. Care must be taken that the position of the focusing glass in the camera coincides with that of the centre of the concave sheet.

When the paper is ready for the camera, it is laid in a moist state ou the concave surface of gutta percha, which should be also previously moistened. If neatly laid on, commencing the contact either in the middle or at oue side, all air-bubbles will be avoided, and the paper will adhere closely and assume the required form.

The further manipulation need not be described, as it corresponds in all respects with that usually pursued in the paper processes.

To render this curved surface available for collodion pictures, it is necessary, to make considerable modifications ou that process as hitherto practised. It is evident at once that glass is out of the question as the medium for carrying the seusitive film, although unexceptionable in all respects but that of flatness.

We have then to seek for a material having a perfectly smooth and polished surface, tolerably transparent, flexible, and insoluble in either alcohol, ether, or water. These conditious may be all fulfilled by the use of that extraordinary material gutta percha. The method is as follows:—Dissolve fifty grains of gutta pepcha in two ounces of pure chloroform, which is better done if the liquid is slightly warmed: let it stand for two or three days, when all the coarse brown matter will have riseu to the top; this may then be seperated, and the solution strained through clean linen.

Then on a sheet of perfectly clean glass, placed level, of the size of either one or more pictures, pour a sufficient quantity of this solution to cover it, and protect it from dust. When the chloroform is evaporated, a thin transparent film of gutta percha remains, which may be easily seperated from the glass. The upper surface is somewhat dull, but the uuder surface, having been formed in contact with the glass has all the smoothness and polish possessed by the latter. The film is now taken up by one edge (by means of a pair of broad tweezers, to prevent it from curling over), turned over, and laid on the glass with its smooth side uppermost, care being taken that no air-bubbles remain undeneath. The collodion is then poured on and drained from one corner in the usual way. It is now ready for the bath of nitrate of silver, which consists simply of a flat dish, having a chamber at one end to coutain the liqnid when uot in use. The collodionised film is floated on this for the requisite time, lifted off with tweezers by oue end, drained, and carefully laid on the concave sheet, which should previously have attached to it a wet sheet of fine black paper. By this means, if the operation is neatly performed, the sensitised film of gutta percha will adhere closely to the wet paper for any requisite length of time. The concave plate, with its seusitive film attached, is then placed in the dark slide and transfered to the camera.

Ou removal from the camera, the film is taken up by the tweezers with the black paper still attached, and laid horizontally on a sheet of glass of equal size, the developing solution poured on in the usual way. When fully developed, a stream of water is poured over the picture still lying on the glass, and the fixiug solution applied in a similar mauner. After the final washing, the picture is laid on a sheet of cardboard sufficiently thick to prevent it from sinking in the middle, and having a raised margin; by which contrivance any number of pictures may be laid one over another without coutact or risk of injury until they can conveniently be secured and mounted for printing.

In describing this modification of the collodion process, I have not thought it necessary to notice all the precautions to be attended to in the manipulation, as they will readily occur to such as have practised the process already published.

With regard to the advantages of the method above described, I conceive that, whatever the process adopted, the concave will be acknowledged as an improvement on the flat one. The uniform focus over the whole field enables us to obtain a given sized picture with a smaller and less expensive lens; or, on the other hand, a larger picture with a given sized lens. The smaller lens has a shorter focus, lessening the length of the camera; the shorter focus lessens the time of exposure. As applied to paper processes, even those in which the paper is used dry, the additional trouble in manipulation is comparatively trifling, and in those where the paper is used wet, there need not be either more trouble or more apparatus than is now practised. But in the case of the collodion process, while the manipulation is only slightly varied, and not rendered in the least degree more complicated, the quantity of apparatus is at the same time considerably diminished, as all vertical baths and dippers are entirely dispensed with, only one flat dish (for the nitrate bath) being necessary; and instead of the stock of glass plates, which now add so much to the weight of a collodion outfit for even a single day's use, all that will be necessary by the proposed method is one sheet of glass, and a stock of gutta percha films preserved between paper in a folio.

I should state that the process is not yet in any respect thoroughly matured; but having satisfactorily established the correctness of the principle, it appeared to me better not to delay making it known, in order that more experienced practitioners may, if they think proper, turn their attention to the subject, and thus tend to bring the process to a higher degree of efficiency than I can hope to do.

From the Jour. of the Phot. Soc.

ON DEVELOPING IN THE WAXED PAPER PROCESS.

To the Editor of the Photographic Journal:

Sir,—I first began my photographic experiments in 1852, and principally with waxed paper.

I must confess, for some time, although I followed Le Gray's process, I never could succeed in producing any good pictures by it. I therefore tried other modifications of his process and with no better success, until lately I discovered that nearly all my failures were to be attributed to the developing operation. I now beg to give, for the benefit of those who like myself have met with so many failures, a few practical hints in using waxed paper. Should my observations not be sufficiently explicit. I shall be most happy to give further explanations either through the medium of the Journal or by post.

I use Marion's waxed paper iodized and rendered sensitive according to Townshend's formulæ.

After washing the sensitive paper, that is the sheets, they ought to be blotted off in clean blotting paper, then placed between other clean sheets ; and in order to keep the sheets clean and smooth they should be put between the leaves of a large book, with the last sheets of blotting paper, until they are placed in the dark frames. The exposure I have found with Townshend's formulæ to be quite as short as with the ordinary calotype paper.

To develope:—Carefully place the exposed side of the sheet on a saturated solution of gallic acid, which must be put into a clean glass or gutta percha dish, taking care to keep the back of the sheet free from being spotted with the solution. Raise and lower each corner of the sheet so as to chase away air-bubbles. Allow it to remain till you level a clean glass plate, and mix 1 oz. gallic acid solution with 1 dr. aceto-nitrate of the usual strength; then filter this on the glass plate and spread it evenly over the plate with a clean piece of writing or blotting paper. The sheet must then be taken off the gallic acid solution and placed carefully in the gallo-nitrate, that is, on the levelled glass plate with the picture side on the solution. The image will begin to appear in the course of four or five minutes, and will be completely developed in fifteen or twenty minutes; but before it is, I prefer taking it off the gallo-nitrate and placing it on the gallic acid in the dish again, but it must be now placed the picture side uppermost, and in order to render the action of the developing fluid as equal as possible, the dish must be gently tilted at one end so that the fluid may flow evenly over the surface of the sheet.

When completely developed, wash with plenty of clean rain-water, changing it six or eight times during two or three hours, so that none of the decomposed developing solution may mix with the hypo-solution

With the above precautions the waxed-paper process is as certain as any other paper process, and the whole of the operations are much easier to perform, besides the advantage of the keeping quality of waxed paper to the tourist. With one washing of the sensitive paper in cold weather it will keep good a week.

I do not mean to say that there is any part of the above that may be regarded as new, but if any one will compare it with the method of Le Gray, he will at once see that it is quite contrary to those proposed by him and other photographers who have written on the subject.

It is a fact, I believe, that many of our amateurs have completely failed in producing anything good by Le Gray's process, but have invariably succeeded when they adopted some modification of it.

In using Le Gray's developing mixture or by following his method, so much decomposed matter is liable to be precipitated on the surface of the paper, that it is impossible to keep the picture clear and transparent.

The sensitive paper may be preserved and exposed in a moist state by floating it on Mr. Shadbolt's honey solution. One of my best negatives was taken with the surface preserved in a moist state by floating honey solution over the sheet after it was blotted dry.

Trusting you will insert the above practical hints in your valuable periodical,

I am, Sir, yours obediently,

Rob. Elliott.

A MANUAL OF PHOTOGRAPHIC CHEMISTRY,*
Including the Practice of the Collodion Process.

BY T. FREDERICK HARDWICH.

CHAPTER II.

VOCABULARY OF PHOTOGRAPHIC CHEMICALS.

ACETIC ACID.

Symbol, $C_4H_3O_3+HO$. Atomic weight, 60.

Acetic Acid is a product of the *oxidation* of Alcohol. Spiritous liquids when perfectly pure, are not affected by exposure to air ; but if a portion of yeast, or *Nitrogenous organic matter* of any kind, be added, it soon acts as a *ferment*, and causes the spirit to unite with oxygen derived from the atmosphere. and so to become *sour* from formation of Acetic Acid or *vinegar*.

Acetic Acid is also produced on a large scale by heating *wood* in close vessels ; a substance distils over which is Acetic Acid contaminated with empyreumatic and tarry matter ; it is termed Pyroligneous Acid, and is much used in commerce.

The most concentrated Acetic Acid may be obtained by neutralizing common vinegar with Carbonate of Soda and crystallizing out the Acetate of Soda so formed ; this Acetate of Soda is then distilled with Sulphuric Acid, which removes the Soda and liberates Acetic Acid : the Acetic Acid being volatile, distils over, and may be condensed.

Properties of Acetic Acid.—The strongest acid contains only a single atom of water ; it is sold under the name of "Glacial

* Continued from page 16, vol. ix. No. 1.

Acetic Acid," so called from its property of solidifying at a moderately low temperature. At about 50° the crystals melt, and form a limpid liquid of pungent odor, and a density nearly corresponding to that of water ; the specific gravity of Acetic Acid, however, is no test of its real strength, which can only be estimated by analysis.

The Commercial *Glacial* Acetic Acid is often diluted with water, which may be suspected if it does not solidify during the cold winter months. Sulphurous and Hydrochloric Acids are also common impurities. They are injurious in Photographic processes from their property of precipitating Nitrate of Silver. To detect them proceed as follows—dissolve a small crystal of Nitrate of Silver in a few drops of water and add to it about half a drachm of the Glacial Acid ; the mixture should remain quite clear even when exposed to the light. Hydrochloric and Sulphurous Acid produce a white deposit of Chloride or Sulphate of Silver ; and if *Aldehyde* or volatile tarry matter is present in the Acetic Acid, the mixture with Nitrate of Silver, although clear at first, becomes discoloured by the action of light.

Many Photographers employ a more dilute form of Acetic Acid, often sold of the strength of "ten per cent. real Acid ;' it should be tested for Sulphuric Acid (see Sulphuric Acid), and also by mixing with Nitrate of Silver.

ACETATE OF IRON. *See* IRON, ACETATE OF.

ACETATE OF SILVER. *See* SILVER, ACETATE OF.

ALBUMEN.

Albumen is an organic principle, found both in the animal and vegetable kingdom. Its properties are best studied in the *white of egg*, which is a very pure form of Albumen.

Albumen is capable of existing in two states; in one of which it is soluble, in the other insoluble, in water. The aqueous solution soluble variety gives a slightly alkaline reaction to test-paper; it is somewhat thick and glutinous, but becomes more fluid on the addition of a small quantity of an alkali, such as potash or Ammonia.

Soluble Albumen may be converted into the *insoluble* form in the following ways :—

1. *By the application of heat.*—A moderately strong solution of Albumen becomes opalescent and coagulates on being heated to about 150°, but a temperature of 212° is required if the liquid is very dilute. A layer of *dried* Albumen cannot easily be coagulated by the mere application of heat.

2. *By addition of strong acids.*—Nitric Acid coagulates Albumen very perfectly without the aid of heat. Acetic Acid however acts differently, appearing to enter into combination with the Albumen, and forming a compound soluble in warm water acidified by Acetic Acid,

3. *By the action of metallic salts.*—Many of the salts of the metals coagulate Albumen very perfectly. Nitrate of Silver does so ; also the Bichloride of Mercury. The precipitate in these cases contain a portion of the base of the salt united with Albumen. The addition of an alkali like Ammonia to Nitrate of Silver prevents the coagulation.

Chemical Composition of Albumen.—Albumen belongs to the *Nitrogenous* class of organic substances (see page 16). It also contains small quantities of Sulphur and Phosphorus. The presence of the former element is shown in the blackening of silvered surfaces, or in the discoloration of Nitrate of Silver Baths, by albumenous solutions, which is due to a formation of *Sulphuret* of Silver.

ALCOHOL.

Symbol, $C_4H_6O_2$. Atomic weight, 46.

Alcohol is obtained by the careful distillation of any spirituous or fermented liquor. If wine or beer be placed in a retort, and heat applied, the Alcohol, being more volatile than water, rises first, and is condensed in an appropriate receiver : a portion of the vapor of water however passes over with the Alcohol, and dilutes it to a certain extent, forming what is termed "Spirits of Wine." Much of this water may be removed by redistillation from Carbonate of Potash, in the manner described at page 326 vol. 8 of this work ; but in order to render the Alcohol thoroughly *anhydrous*, it is necessary to employ *quick Lime*, which possesses a still greater attraction for water. An equal weight of this powdered lime is mixed with strong Alcohol of ·823, and the two are distilled together.

Properties of Alcohol.—Pure anhydrous Alcohol is a limpid liquid, of an agreeable odor and pungent taste ; sp. gr. at 60°, ·794. It absorbs vapor of water, and becomes diluted by exposure to damp air ; boils at 173° Fahr. It has never been frozen.

Alcohol distilled from Carbonate of Potash has a sp. gr. of ·823, and contains 90 per cent. of real spirit.

The specific gravity of ordinary rectified Spirits of Wine is usually about ·840, and it contains 80 to 83 per cent. of absolute Alcohol.

AMMONIA.

Symbol. NH_3 or NH_4O. Atomic weight, 17.

The liquid known by this name is an aqueous solution of a volatile gas.

Ammoniacal gas contains 1 atom of Nitrogen combined with 3 of Hydrogen : these two elementary bodies exhibit no affinity for each other, but they can be made to unite under certain circumstances, and the result is Ammonia.

Properties of Ammonia.—Ammoniacal gas is soluble in water to a large extent ; the solution possessing those properties which are termed alkaline (see page 12). Ammonia however differs from the other alkalies in one important particular—it is volatile : hence the original color of turmeric paper affected by Ammonia is restored on the Application of heat. Solution of Ammonia absorbs Carbonic Acid rapidly from the air and is converted into Carbonate of Ammonia ; it should therefore be preserved in stoppered bottles. Besides Carbonate, commercial Ammonia often contains Chloride of Ammonium, recognized by the white precipitate given by Nitrate of Silver after acidifying with pure Nitric Acid.

The strength of commercial Ammonia varies greatly : that sold for pharmaceutical purposes, under the name of Liquor Ammoniæ, contains about 10 per cent. of real Ammonia. The sp. gr. of aqueous Ammonia *diminishes* with the proportion of Ammonia present, the Liquor Ammoniæ being usually about ·936.

Chemical Properties.—Ammonia, although forming a large class of salts, appears at first sight to contrast strongly in composition with the alkalies proper, such as Potash and Soda. Mineral bases generally are *protoxides of metals*, as already shown at page 12, but Ammonia consists simply of Nitrogen and Hydrogen united without Oxygen. The following remarks may perhaps tend somewhat to elucidate the difficulty.

Theory of Ammonium.—This theory supposes that a substance exists possessing the properties of a *metal*, but different from metallic bodies generally in being *compound* in structure : the formula assigned to it is NH_4 ; that is, 1 atom of Nitrogen united with 4 of Hydrogen.

This hypothetical metal is termed "Ammonium," and Ammonia, associated with an atom of water, may be viewed as its Oxide ; for NH_3+HO plainly equals NH_4O. Thus as Potash is the Oxide of *Potassium*, so Ammonia is the Oxide of *Ammonium.*

The composition of the *salts* of Ammonia is also in this view assimilated to those of the alkalies proper. Thus, Sulphate of Ammonia is a Sulphate of the Oxide of Ammonium ; Muriate or Hydrochlorate of Ammonia is a Chloride of Ammonium, etc.

AQUA REGIA. *See* NITRO-HYDROCHLORIC ACID.

BARYTA, NITRATE OF. *See* NITRATE OF BARYTA.

BICHLORIDE OF MERCURY.
See MERCURY, BICHLORIDE OF.

BROMINE.

Symbol, Br. Atomic weight, 78.

This elementary substance is obtained from the uncrystalliz-

able residue of sea-water termed *bittern*. It exists in the water in very minute proportion, and combined with Magnesium, in the form of a soluble Bromide of Magnesium.

Properties.—Bromine is a deep reddish-brown liquid of a disagreeable odor, and fuming strongly at common temperatures; sparingly soluble in water (1 part in 23, Löwig), but more abundantly so in Alcohol, and especially in Ether. It is very heavy, having a specific gravity of 3·0.

Bromine is closely analogous to Chlorine and Iodine in its chemical properties. It stands on the lists intermediately between the two; its affinities being stronger than those of Iodine, but weaker than Chlorine. (See Chlorine.)

It forms a large class of salts, of which the Bromides of Potassium, Cadmium, and Silver are the most familiar to Photographers.

BROMIDE OF POTASSIUM.

Symbol, KBr. Atomic weight, 118.

Bromide of Potassium is prepared by adding Bromine to Caustic Potash, and heating the product, which is a mixture of Bromide of Potassium and Bromate of Potash, to redness, in order to drive off the Oxygen from the latter salt. It crystallizes in anhydrous cubes like the Chloride, and Iodide, of Potassium; it is easily soluble in water, but more sparingly so in Alcohol; it yields red fumes of Bromine when acted upon by Sulphuric Acid.

BROMIDE OF SILVER. *See* SILVER, BROMIDE OF.

CARBONATE OF SODA.

Symbol, NaO CO_2+10 Aq.

This salt was formerly obtained from the ashes of sea-weeds, but is now more economically manufactured on a large scale from common salt. The Chloride of Sodium is first converted into Sulphate of Soda, and afterwards the Sulphate into Carbonate of Soda.

Properties.—The perfect crystals contain ten atoms of water, which are driven off by the application of heat, leaving a white powder—the anhydrous Carbonate. *Common washing Soda* is a neutral Carbonate, contaminated to a certain extent with Chloride of Sodium and Sulphate of Soda. The Carbonate used for effervescing draughts is either a Bicarbonate with 1 atom of water, or a Sesquicarbonate, containing about 40 per cent. of real alkali; it is therefore nearly double as strong as the washing Carbonate, which contains about 22 per cent. of Soda. Carbonate of Soda is soluble in twice its weight of water at 60°, the solution being strongly alkaline.

CARBONATE OF POTASH.

See POTASH, CARBONATE OF.

CASEINE. *See* MILK.

CHARCOAL, ANIMAL.

Animal Charcoal is obtained by heating animal substances, such as bones, dried blood, horns, etc. to redness in close vessels, until all volatile empyreumatic matters have been driven off and a residue of Carbon remains. When prepared from bones it contains a large quantity of inorganic matter in the shape of Carbonate and Phosphate of Lime, the former of which salts produce *alkalinity* in reacting upon Nitrate of Silver (see p. 228.) Animal Charcoal is freed from these earthy salts by repeated digestion in Muriatic Acid, but unless very carefully washed it is apt to retain an acid reaction, and so to liberate free Nitric Acid when added to solution of Nitrate of Silver.

Properties.—Animal charcoal, when pure, consists solely of Carbon, and burns away in the air without leaving any residue: it is remarkable for its property of discolorizing solutions; the organic coloring substance being separated, but not actually *destroyed* as it is by *Chlorine* employed as a bleaching agent. This power of absorbing coloring matter is not possessed in an equal degree by all varieties of Charcoal, but is in a great measure peculiar to those derived from the animal kingdom.

CHINA CLAY, OR KAOLIN.

This is prepared, by careful levigation, from mouldering granite and other disintegrated felspathic rocks. It consists of the *Silicate of Alumina*—that is, of Silicic Acid or *flint*, which is an Oxide of Silicon, united with the base Alumina (Oxide of Aluminum.) Kaolin is perfectly insoluble in water and acids, and produces no decomposition in solution of Nitrate of Silver. It is employed by Photographers to decolorize solutions of Nitrate of Silver, which it does by absorbing the brown matter.

CHLORINE.

Symbol, Cl. Atomic weight, 36.

Chlorine is a chemical element found abundantly in nature, combined with metallic Sodium in the form of Chloride of Sodium, or Sea-salt.

Preparation.—By distilling common Salt with Sulphuric Acid, Sulphate of Soda and Hydrochloric Acid are formed. Hydrochloric Acid contains Chlorine combined with Hydrogen; by the action of *nascent* Oxygen (see Oxygen), the hydrogen may be removed in the form of water, and the Chlorine left alone.

Properties.—Chlorine is a greenish-yellow gas, of a pungent and suffocating odor; soluble to a considerable extent in water, the solution possessing the odor and color of the gas. It is nearly $2\frac{1}{2}$ times as heavy as a corresponding bulk of atmospheric air.

Chemical Properties.—Chlorine belongs to a small natural group of elements which contains, besides itself, Bromine, Iodine, and Fluorine. They are characterized by having a strong affinity for Hydrogen, and also for the metals, but are comparatively indifferent to Oxygen. Many metallic substances actually undergo *combustion* when projected into an atmosphere of Chlorine, the union between the two taking place with extreme violence. The characteristic bleaching properties of Chlorine gas are explained in the same manner—Hydrogen is removed from the organic substance, and in that way the structure is broken up and the color destroyed.

Chlorine is more powerful in its affinities than either Bromine or Iodine. The salts formed by these three elements are closely analogous in composition and often in properties. Those of the Alkalies, Alkaline Earths, and many of the Metals are soluble in water, but the silver salts are insoluble; the Lead salts sparingly so.

The combinations of Chlorine, Bromine, Iodine and Fluorine, with Hydrogen, are acids, and neutralize Alkalies in the usual manner, with formation of Alkaline Chloride and water (see page 13).

The test by which the presence of Chlorine is detected either free or in combination with bases, is *Nitrate of Silver*; it gives a white curdy precipitate of Chloride of Silver, insoluble in Nitric Acid, but soluble in Ammonia. The solution of Nitrate of Silver employed as the test must not contain Iodide of Silver.

CHLORIDE OF AMMONIUM.

Symbol, N H_4 Cl. Atomic weight, 54.

This salt, also known as Muriate or Hydrocholorate of Ammonia, occurs in commerce in the form of colorless and translucent masses, which are procured by *sublimation*, the dry salt being volatile when strongly heated. It dissolves in an equal weight of boiling, or in three parts of cold, water. It contains more *Chlorine*, in proportion to the weight used, then Chloride of Sodium, the atomic weights of the two being as 54 to 60

CHLORIDE OF BARIUM.

Symbol, BaCl+2 HO.—Atomic weight, 123.

Barium is a metallic element, very closely allied to Calcium, the elementary basis of *Lime*. The Chloride of Barium is commonly employed as a test for Sulphuric Acid, with which it forms an insoluble precipitate of Sulphate of Baryta; also in preparing positive paper, as a substitute for Chloride of Sodium, but in this respect it seems to possess no advantages.

Properties of Chloride of Barium.—Chloride of Barium occurs in the form of white crystals, soluble in about two parts of water at common temperature. These crystals contain two atoms of water of crystallization, which are expelled at 212°, leaving the anhydrous Chloride.

CHLORIDE OF GOLD. *See* GOLD, CHLORIDE OF.

CHLORIDE OF SODIUM.

Symbol, NaCl. Atomic weight, 60.

Common Salt exists abundantly in nature, both in the form of solid rock salt and dissolved in the waters of the ocean.

Properties of the pure Salt.—Fusible without decomposition at low redness, but sublimes at higher temperatures ; the melted salt concretes into a hard white mass on cooling. Nearly insoluble in absolute alcohol, but dissolves in minute quantity in rectified spirit. Soluble in three parts of water, both hot and cold. Crystallizes in cubes, which are anhydrous.

Impurities of Common Salt.—Table salt often contains large quantities of the Chlorides of Magnesium and Calcium, which being deliquescent produce a dampness by absorption of atmospheric moisture : also Sulphate of Soda is commonly present. The salt may be purified by repeated recrystallization, but it is more simple to prepare the pure compound *directly*, by neutralizing Hydrochloric Acid with Carbonate of Soda.

CHLORIDE OF SILVER. *See* SILVER, CHLORIDE OF.

CYANIDE OF POTASSIUM.

Symbol, K,C_2N, or KCy. Atomic weight, 66.

This salt is a compound of Cyanogen gas with the metal Potassium. Cyanogen is not an elementary body, like Chlorine or Iodine, but consists of Carbon and Nitrogen united in a peculiar manner. Although a compound substance, it reacts in the manner of an element, and is therefore (like *Ammonium* previously described) an exception to the usual laws of chemistry, as given in the last chapter. Many other bodies of a similar character are known, but it is not necessary to allude to them at the present time.

Properties of Cyanide of Potassium.—These have already been described at page 194, to which the reader is referred.

ETHER.

Symbol, C_4H_5O. Atomic weight, 37.

Ether is obtained by distilling a mixture of Sulphuric Acid and Alcohol. If the formula of Alcohol ($C_4H_6O_2$) be compared with that of Ether, it will be seen to differ from it in the possession of an additional atom of Hydrogen and of Oxygen ; in the reaction, the Sulphuric Acid removes these elements in the form of *water*, and by so doing converts one atom of Alcohol into an atom of Ether. The term *Sulphuric* applied to the commercial Ether has reference only to the manner of its formation.

Properties of Ether.—The properties of Ether have been described to some extent at page 326. The following particulars however may be added. It is neither acid nor alkaline to test-paper Specific gravity at 60°, about ·720. Boils at 98° Fahrenheit. The vapor is exceedingly dense, and may be seen passing off from the liquid and falling to the ground : hence the danger of pouring Ether from one bottle to another if a flame be near at hand.

Ether does not mix with water in all proportions ; hence if the two are shaken together, after a short time the former rises and floats upon the surface. In this way a mixture of Ether and Alcohol may be purified to some extent, as in the common process of *washing* Ether. The water employed however always retains a certain portion of Ether (about a tenth part of its bulk,) and acquires a strong ethereal odor ; washed Ether also contains water in small proportion.

Bromine and Iodine are both soluble in Ether and gradually react upon and decompose it. (See page 227.)

The strong alkalies, such as potash and Soda, also decompose Ether slightly after a time, but not immediately (page 326). Exposed to air and light, Ether is oxidized and acquires a peculiar odor. (Page 226).

Ether dissolves fatty and resinous substances readily, but inorganic salts are mostly insoluble in this fluid. Hence it is that Iodide of Potassium and other substances dissolved in Alcohol are precipitated to a certain extent by the addition of Ether.

FLOURIDE OF POTASSIUM.

Symbol, KF. Atomic weight, 59.

Preparation.—Flouride of Potassium is formed by saturating Hydroflouric Acid with Potash, and evaporating to dryness in a platinum vessel. *Hydroflouric Acid* contains Fluorine combined with Hydrogen ; it is a powerfully acid and corrosive liquid, formed by decomposing Fluor Spar, which is a *Fluoride of Calcium*, with strong Sulphuric Acid, the action which takes place being precisely analogous to that involved in the preparation of Hydrochloric Acid, which see.

Properties.—A deliquescent salt, occurring in small and imperfect crystals. Very soluble in water ; the solution acts upon glass in the same manner as Hydrofluoric Acid.

FORMIC ACID.

Symbol, C_2HO_3. Atomic weight, 37.

This substance was originally discovered in the *red ant (Formica Rufa)* but it is prepared on a large scale by distilling *Starch* with Binoxide of Manganese and Sulphuric Acid.

Properties.—The strength of commercial Formic Acid is uncertain, but it is always more or less dilute. The strongest acid, as obtained by distilling Formiate of Soda with Sulphuric Acid, is a fuming liquid with a pungent odor, and containing only one atom of water ; it inflames the skin in the same manner as the sting of the ant.

Formic Acid reduces the Oxides of Gold, Silver and Mercury to the metallic state, and is itself oxidized into Carbonic Acid. The alkaline formiates also possess the same properties.

GALLIC ACID.

Symbol, $C_7H_3O_5+HO$. Atomic weight, 94.

The chemistry of Gallic Acid is sufficiently described at page 180, which see.

GELATINE.

Symbol, $C_{10}H_{16}O_5N_2$. Atomic weight, 156.

This is an organic substance somewhat analogous to Albumen, but differing from it in properties. It is obtained by subjecting bones, hoofs, horns, calves' feet,&c. to the action of boiling water. The jelly formed on cooling is termed *size*, or when dried or cut into slices, *glue*. Gelatine, as it is sold in the shops, is a pure form of Glue. *Isinglass* is Gelatine prepared, chiefly in Russia, from the air-bladder of certain species of sturgeon.

Properties of Gelatine.—Gelatine softens and swells up in cold water, but scarcely *dissolves* until heated : the hot solution on cooling, forms a tremulous jelly. One ounce of cold water will retain about three grains of Isinglass without gelatinizing ; but much depends upon the temperature, a few degrees greatly affecting the result.

Gelatine does not form any compound with Oxide of Silver in the manner of Albumen, which fact may explain the difference in their photographic action.

GOLD, CHLORIDE OF.

Symbol, $AuCl_3$. Atomic weight 308.

This salt is formed by dissolving pure metallic Gold in Nitro-hydrochloric Acid, and evaporating at a gentle heat. The solution affords deliquescent crystals of a deep orange color.

Chloride of Gold, in a state fit for Photographic use, may easily be obtained by the following process :—Place a half-sovereign in any convenient vessel, and pour on it half a drachm of Nitric Acid mixed with two and a half drachms of Hydrochloric Acid and three drachms of water ; digest by a gentle heat, but do not *boil* the acid, or much of the Chlorine will be driven off in the form of gas. At the expiration of a few hours

add fresh Aqua Regia in quantity the same as at first, which will probably complete the solution, but if not repeat the dose a third time.

Lastly, neutralize the liquid by adding Carbonate of Soda until all effervescence ceases, and a green precipitate begins to form; this is *Carbonate of Copper*, which must be allowed several hours to separate thoroughly. The solution then contains Chloride of Gold in a neutral state, and free from Copper and Silver, with which the metallic Gold is alloyed in the standard coin of the realm.

The weight of a half-sovereign is about 61 grains, of which 56 grains are pure gold. This is equivalent to 86 grains of Chloride of Gold, which will therefore be the quantity contained in the solution.

When the large excess of free acid, left in the liquid after dissolving Gold, is neutralized by Carbonate of Soda, a considerable quantity of *Chloride of Sodium* is necessarily formed, which although not very injurious, has a *slight* retarding effect upon the toning action of the Chloride, when employed in the Bath, therefore if any apparatus is at hand for driving off the excess of acid by evaporation *at a gentle heat*, it will be better to do so, afterwards redissolving in water, and adding the Carbonate of Soda in small quantity until the liquid is exactly neutral: if however the aqueous solution of the Chloride appears of an orange-red color in place of a lemon yellow, it is already in a neutral state, and no addition of alkali will be required.

Avoid using *Ammonia* to neutralize the liquid, as it would be liable to occasion a deposit of "Fulminating Gold," which is Oxide of Gold combined with Ammonia.

Properties of Chloride of Gold.—As sold in commerce it usually contains excess of Hydrochloric Acid, and is then of a bright yellow color, but when neutral and somewhat concentrated, it is dark red (*Leo ruber* of the alchemists). It gives no precipitate with Carbonate of Soda, unless heat be applied; the free Hydrochloric Acid present, forms with the alkali, Chloride of Sodium which unites with the Chloride of Gold, and produces a double salt, Chloride of Gold and Sodium, soluble in water.

Chloride of Gold is decomposed with precipitation of metallic Gold by Charcoal, Sulphurous Acid, and many of the vegetable acids; also by Protosulphate and Protonitrate of Iron. It tinges the cuticle of an indelible purple tint. It is soluble in Alcohol and also in Ether.

GOLD, HYPOSULPHITE OF.

Symbol, $AuO\ S_2O_2$. Atomic weight, 256.

Hyposulphite of Gold is produced by the reaction of Chloride of Gold upon Hyposulphite of Soda.

The salt sold in commerce as Sel d'Or, is a double Hyposulphite of Gold and Soda, containing one atom of the former salt to three of the latter, with four atoms of water of crystallization. It is formed by adding one part of Chloride of Gold in solution to three parts of Hyposulphite of Soda, and precipitating the resulting salt by Alcohol; the Chloride of Gold must be added to the Hyposulphite of Soda, and not the Soda salt to the Gold (See page 207.)

Properties.—Hyposulphite of Gold is unstable and cannot exist in an isolated state; it quickly passes into Sulphur, Sulphuric Acid and metallic Gold. When combined with excess of Hyposulphite of Soda in the form of Sel d'Or it is more permanent.

Sel d'Or occurs crystallized in fine needles, which are very soluble in water. The commercial article is often impure, containing little else than Hyposulphite of Soda, with a trace of Gold. It may be analyzed by adding a few drops of strong Nitric Acid (free from Chlorine) diluting with water, and afterwards collecting and igniting the yellow powder, which is metallic Gold.

GRAPE SUGAR.

Symbol, $C_{24}H_{28}O_{28}$. Atomic weight, 396.

This modification of Sugar, often termed *Granular Sugar* or *Glucose*, exists abundantly in the juice of grapes, and in many other varieties of fruit. It forms the saccharine concretion found in honey, raisins, dried figs, etc. It may be produced artificially by the action of fermenting principles, and of dilute mineral acids, upon starch.

Properties.—Grape Sugar crystallizes slowly and with difficulty from a concentrated aqueous solution, in small hemispherical nodules, which are hard and feel gritty between the teeth. It is much less sweet to the taste than Cane Sugar, and not soluble in water (1 part dissolves in $1\frac{1}{2}$ of cold water.) Grape Sugar tends to absorb oxygen, and hence it possesses the property of decomposing the salts of the noble metals, and reducing them by degrees to the metallic state even without the aid of light. The action however in the case of *Nitrate of Silver* is slow, unless the temperature is somewhat elevated. *Cane* Sugar does not possess these properties to an equal extent, and hence it is readily distinguished from the other variety.

HONEY.

This substance contains two distinct kinds of Sugar,—the Grape Sugar, and an uncrystallizable substance analogous to, or identical with, the Treacle found associated with common Sugar in the cane-juice. The agreeable taste of Honey probably depends upon the latter, but its reducing power on metallic oxides is due to the former. Pure Grape Sugar can readily be obtained from inspissated Honey, by treating it with Alcohol, which dissolves out the syrup, but leaves the crystalline portion.

HYDROCHLORIC ACID.

Symbol, HCl. Atomic weight, 37.

Hydrochloric Acid is a volatile gas, which may be liberated from the salts termed Chlorides by the action of Sulphuric Acid. The acid, by its superior affinities removes the base; thus.—

$$NaCl + HO\ SO_3 = NaO\ SO_3 + HCl.$$

Properties.—Abundantly soluble in water, forming the liquid Hydrochloric or Muriatic Acid of commerce. The most concentrated solution of Hydrochloric Acid has a sp. gr. 1·2, and contains about 40 per cent. of gas; that commonly sold is somewhat weaker, sp. gr. 1·14 = 28 per cent. real acid.

Pure Hydrochloric Acid is colorless, and fumes in the air. The yellow color of the commercial acid depends upon the presence of traces of Perchloride of Iron or organic matter; commercial Muriatic Acid also often contains a portion of free Chlorine and of Sulphuric Acid.

HYDRIODIC ACID.

Symbol, HI. Atomic weight, 127.

This is a gaseous compound of Hydrogen and Iodine, corresponding in composition to the Hydrochloric Acid. It cannot, however, from its instability, be obtained in the same manner, since, on distilling an Iodide with Sulphuric Acid, the Hydriodic Acid first formed is subsequently decomposed into Iodine and Hydrogen. An aqueous solution of Hydriodic Acid is easily prepared by adding Iodine to water containing Sulphuretted Hydrogen gas; a decomposition takes place, and Sulphur is set free: thus, $HS + I = HI + S$.

Properties.—Hydriodic Acid is very soluble in water, and yields a strongly acid liquid. The solution, colorless at first, soon becomes brown from decomposition, and liberation of free Iodine. It may be restored to its original condition by adding solution of Sulphuretted Hydrogen.

HYDROSULPHURIC ACID.

Symbol, HS. Atomic weight, 17.

This substance, also known as Sulphuretted Hydrogen, is a gaseous compound of Sulphur and Hydrogen, analogous in composition to Hydrochloric and Hydriodic Acids. It is usually prepared by the action of Sulphuric Acid upon Sulphuret of Iron; the decomposition which ensues under these circumstances is similar to that involved in the preparation of the Hydrogen acids generally:—

$FeS + HO\ SO_3 = FeO\ SO_3 + HS.$

Properties.—Cold water absorbs three times its bulk of Hydrosulphuric Acid, and acquires the peculiar odor and poisonous qualities of the gas. The solution is faintly acid to test-paper, and becomes opalescent on keeping, from gradual separation of Sulphur. It is decomposed by Nitric Acid, and also by Chlorine and Iodine. It precipitates Silver from its solutions, in the form of black Sulphuret of Silver, also Copper, Mercury, Lead, etc.; but Iron and other metals of that class are not affected if the liquid contains free acid. Hydrosulphuric Acid is constantly employed in the chemical laboratory for these and other purposes.

HYDROSULPHATE OF AMMONIA.

Symbol, $NH_4S\ HS$. Atomic weight, 51.

The liquid known by this name, and formed by passing Sulphuretted Hydrogen gas into Ammonium. In the preparation, the passage of the gas is to be continued until the solution gives no precipitate with Sulphate of Magnesia and smells strongly of Hydrosulphuric Acid.

Properties.—Colorless at first, but afterwards changes to yellow from liberation and subsequent solution of Sulphur. Becomes milky on the addition of any acid. Precipitates in the form of Sulphuret, all the metals which are affected by Sulphuretted Hydrogen, and, in addition, those of the class to which Iron, Zinc, and Manganese belong.

Hyposulphate of Ammonia is employed in Photography to darken the Negative image, and also in the preparation of Iodide of Ammonium; the separation of Silver from Hyposulphite solutions, etc.

HYPOSULPHITE OF SODA.

Symbol, $NaO\ S_2O_2 + 5HO$ Atomic weight, 125.

The chemistry of Hyposulphurous Acid and the Hyposulphite of Soda has been sufficiently described on previous pages of the present Work. The crystallized salt includes five atoms of water of crystallization, and has an atomic weight of 125.

HYPOSULPHITE OF GOLD. *See* HYPOSULPHITE OF.

HYPOSULPHITE OF SILVER. *See* SILVER, HYPOSULPHITE OF.

IODINE.

Symbol, I. Atomic weight, 126.

Iodine is chiefly prepared at Glasgow, from *kelp*, which is the fused ash obtained by burning seaweeds. The waters of the ocean contain minute quantities of the Iodides of Sodium and Magnesium, which are separated and stored up by the growing tissues of the marine plant.

In the preparation, the mother-liquor of kelp is evaporated to dryness and distilled with Sulphuric Acid; the Hydriodic Acid thus formed is decomposed by the high temperature, and fumes of Iodine condense in the form of opaque crystals.

Properties.—Iodine has a bluish-black color and metallic lustre; it stains the skin yellow, and has a pungent smell like diluted Chlorine. It is extremely volatile when moist, boils at 350°, and produces dense violet colored fumes, which condense in brilliant plates. Sp. gr. 4.946. Iodine is very sparingly soluble in water, 1 part requiring 7000 parts for perfect solution: even this minute quantity however tinges the liquid of a brown color. Alcohol and Ether dissolve it more abundantly, forming dark-brown solutions. Iodine also dissolves freely in solutions of the alkaline Iodides, such as the Iodide of Potassium, of Sodium, and of Ammonium.

Chemical Properties.—Iodine belongs to the Chlorine group of elements, characterized by forming acids with Hydrogen, and combining extensively with the metals, (see Chlorine). They are however comparatively indifferent to Oxygen, and also to each other. The Iodides of the alkalies, and alkaline earths (see page 11) are soluble in water; also those of Iron, Zinc, Cadmium, etc. The Iodides of Lead, Silver and Mercury are nearly or quite insoluble.

Iodine possesses the property of forming a compound of a deep blue color with Starch. In using this as a test, it is necessary first to liberate the Iodine (if in combination), by means of Chlorine or Nitric Acid saturated with Peroxide of Nitrogen. The presence of Alcohol or Ether interferes to a certain extent with the result.

IODIDE OF AMMONIUM.

Symbol, NH_4I Atomic weight, 144.

The preparation and properties of this salt are described at page 327, vol. 8, to which the reader is referred.

IODIDE OF CADMIUM.

Symbol, CdI. Atomic weight, 182.

See page 327 vol. 8, for the properties of this salt.

IODIDE OF IRON.

Symbol, FeI. Atomic weight, 154.

Iodide of Iron is prepared by digesting an excess of Iron filings with solution of Iodine. (See page 327.) It is very soluble in water and Alcohol, but the solution rapidly absorbs Oxygen and deposits Peroxide of Iron; hence the importance of preserving it in contact with metallic Iron, with which the separated Iodine may recombine. By very careful evaporation, hydrated crystals of Protoiodide may be obtained, but the composition of the solid salt usually sold under that name cannot be depended on.

The *Periodide* of Iron, corresponding to the *Perchloride*, has not been examined, and it is doubtful if such a compound exists.

IODIDE OF POTASSIUM.

Symbol, KI. Atomic weight, 166.

This salt is usually formed by dissolving Iodine in solution of Potash until it begins to acquire a brown color; a mixture of Iodide of Potassium and *Iodate of Potash* is thus formed; but by evaporation and heating to redness, the latter salt parts with its Oxygen, and is converted into Iodide of Potassium.

Properties.—It forms cubic and prismatic crystals, which should be hard and *very slightly or not at all deliquescent.* Soluble in less than an equal weight of water at 60°; it is also soluble in Alcohol, but not in Ether. The proportion of Iodide of Potassium contained in a saturated alcoholic solution, varies with the strength of the spirit,—with common Spirits of Wine, sp. gr. ·836, it would be about 8 grains to the drachm; with Alcohol rectified from Carbonate of Potash, sp. gr. ·823, 4 or 5 grains with absolute Alcohol, 1 to 2 grains. The solution of Iodide of Potassium is instantly colored brown by free Chlorine (page 275); also very rapidly by Peroxide of Nitrogen (page 77); ordinary acids however act less quickly, Hydriodic Acid being first formed, and subsequently decomposing spontaneously.

The impurities of commercial Iodide of Potassium, with the means to be adopted for their removal, are fully given at page 327.

IODIDE OF SILVER. *See* IODIDE OF.

IRON, PROTOACETATE OF.

Symbol, $FeO\ C_4H_3O_3$. Atomic weight, 87.

There are two Acetates of Iron, both soluble in water,—a Protoacetate, the solution of which is colorless, or nearly so, and a red Peracetate. The former, which corresponds in composition and properties to the Protosulphate and Protonitrate of Iron, may be obtained by mixing Acetate of Lead and Sulphate of Iron in atomic proportions. For a solution to contain 10 grains to the ounce, 16 grains of Sulphate of Iron and 21 grains of Acetate of Lead, each dissolved in four drachms of *cold* water will be required.

IRON, PROTOSULPHATE OF.

Symbol, $FeO\ SO_3 + 7HO$. Atomic weight, 139.

The properties of this salt, and also of the two salifiable Ox-

ides of Iron, are described in Part I., page 180. It dissolves in rather more than an equal weight of cold water, or in less of boiling water.

Aqueous solution of Sulphate of Iron absorbs the *Binoxide of Nitrogen*, acquiring a deep olive-brown color: as this gaseous Binoxide is itself a reducing agent, the liquid so formed has beeu proposed as a more energetic developer than the Sulphate of Iron alone.

IRON, PROTONITRATE OF.

Symbol, $FeO\ NO_5+7\ HO$. Atomic weight, 153.

This salt, by careful evaporation *in vacuo* over Sulphnric Acid, forms transparent crystals of a light green color, and containing 7 atoms of water, like the Protosulphate. It is exceedingly unstable, and soon becomes red from decomposition, unless preserved from contact with air. The preparation of solution of Protonitrate of Iron employed for developing Collodion Positives, is given in a former page of this work.

IRON, PERCHLORIDE OF.

Symbol, $Fe_2\ Cl_3$. Atomic weight, 164.

There are two Chlorides of Iron, corresponding iu composition to the Protoxide aud the Sesquioxide respectively. The Protochloride is very soluble in water, forming a green solution, which precipitates a dirty white Protoxide ou the addition of an alkali. The Perchloride, on the other hand, is dark brown, and gives a foxy-red precipitate with alkalies.

Preparation.—A solution of Perchloride of Iron may easily be obtained by dissolving Iron wire in dilute Aqua Regia, but in that case it must be evaporated to dryuess to drive off the excess of acid, or it does not succeed wcll for Photographic use in preparing the Bath described at Page 363. A better plan is to dilute the yellow Muriatic Acid of commerce with an equal bnlk of water, and to boil up for a quarter of an hour with the red Oxide of Iron, sold as "precipitated Carbonate of Iron." About three drachms of the Oxide is sufficient for two ounces of the diluted acid, and will probably leave an excess which siuks to the bottom. The clear solution of Perchloride being poured off is fit for use; it coutains a small quantity of free Hydrochloric Acid, but this produces no injurious effect.

Properties.—Perchloride of Iron may be obtuined in the solid form by heating Iron wire in excess of Chlorine; it coudenses iu the shape of brilliant and irredescent brown crystals, which are volatile, and dissolve in water, the solutiou being acid to test-paper. It is also soluble in Alcohol, forming the Tinctura Ferri Sesquichlorida of Pharmacopœia. Commercial Perchloride of Iron ordinarily contains au excess of Hydrochloric Acid.

LITMUS.

Litmus is a vegetable substance, prepared from various *lichens* which are principally collected on rocks adjoining the sea. The coloring matter is extracted by a peculiar process, and afterwards made up into a paste with chalk, plaster of Paris, etc.

Litmus occurs in commerce in the form of small cubes, of a fine violet color. In using it for the preparation of test-papers, it is digested in hot water, and sheets of porous paper are soaked in the blne liquid so formed. The red papers are prepared at first in the same manner, but afterwards placed in water which has been rendered faintly acid with Sulphuric or Hydrochloric Acid.

MAGNESIA, NITRATE OF. See Nitrate of Magnesia.

MERCURY, BICHLORIDE OF.

Symbol, $HgCl_2$. Atomic weight, 274.

This salt, also called Corrosive Sublimate, and sometimes *Chloride of Mercury* (the atomic weight of Mercury being halved), may be formed by heating Mercury in excess of Chlorine, or more economically, by subliming of Persulphate of Mercury and Chloride of Sodium.

Properties.—A very corrosive and poisonous salt usually sold in semi-transparent, crystalline masses or in the state of powder. Soluble in 16 parts of cold, and in 3 of hot water; more abundantly so in Alcohol, and also in Ether. The solubility in water may be increased almost to any extent by the addition of free Hydrochloric Acid.

The Protochloride of Mercnry is an insoluble white powder familiarly known under the name of *Calomel.*

MILK.

The Milk of herbivorous animals contains three principals consituents—Caseine, fatty matter, and Sugar; in addition to these, small quantities of the Chlorides of Pottassinm and of Phosphate of Lime and Magnesia are present.

1st. *Caseine.*—This is an organic principle somewhat analogous to Albumen in composition and properties. Its solntion in water however, does not *coagulate* on boiling, unless an acid of some kind be present, which probably removes a small portion of alkali with which the Caseine was prcviously combined. The substance termed "rennct," which is the dried stomach of the calf, possesses the property of coagulating Caseine very perfectly, but the exact mode of its action is unknown; it shonld be washed in water before nse. Sherry Wine is also commonly employed to curdle milk, but brandy and other spirituous liquids, when free from *acid and astringent matter*, have no effect.

Coagulated Caseine commonly known as *curds*, is insoluble in water, but combines both with acids and alkalies; hence when milk is curdled either by Acetic or Lactic Acid, it is probable that a small portion of Caseine remains in solution which may explain the peculiar *reddening action* of Sernm of Milk upon reduced Silver salts, so similar to that produced by Albumen.

2nd. *Fatty Matter.*—This forms the greater part of the cream which rises to the surface of milk on standing; it is contained in small cells, which are abundantly diffused throughout the liquid, and give it its peculiar opalescent milky appearance; hundred of these little globules may be seen by subjecting milk to microscopic examination. The presence of fat explains why the filtration of Serum of Milk proceeds so slowly—the pores of the filter being stopped up by the oily matter; it is therefore an advantage to use *skimmed* milk iu preference to fresh when it cau be obtaincd pure.

3rd. *Sugar.*—Sugar of Milk is peculiar in its properties, and differs from both cane and grape sugar; it may be obtained by evaporating *whey* uutil crystallization begins to take place. It is hard and gritty and only slightly sweet; slowly soluble, without forming a syrup, in abont two and a half parts of boiling, and six of cold water. It does not ferment and form Alcohol on the addition of yeast, like grape sugar, but by the action of *decomposing animal matter* is converted into *Lactic Acid.*

When skimmed milk is exposed to the air for some honrs it gradually becomes *sour*, from Lactic Acid formed in this way; and if theu heated to ebullition the Caseine coagulates very perfectly. By subsequently clarifying with Albumen the liquid is so completely freed from fat that it will run throngh blotting paper almost as readily as water.

NITRIC ACID.

Symbol, NO_5. Atomic weight, 54.

Nitric Acid or *Aqua-fortis* is prepared by adding Sulphnric Acid to Nitrate of Potash and distilling the mixture in a retort. Sulphate of Potash and free Nitric Acid are formed, the latter of which being volatile, distils over in combination with one atom of water previously uuited with the Sulphuric Acid.

Properties.—Anhydrous Nitric Acid is a solid snbstance, white and crystalline, but it cannot be prepared except by a most expensive and complicated process.

The concentrated *liquid* Nitric Acid contains one atom of water, and has a sp. gr. of about 1·5; if perfectly pnre it is colorless, but usually it has a slight yellow tint, from partial decomposition into Peroxide of Nitrogen: it fumes strongly in the air.

The strength of commercial Nitric Acid is subjcct to much

variation. An acid of sp. gr. 1·42, containing about 4 atoms of water is commonly met with. If the specific gravity is much lower than this (less than 1·36), it will scarcely be adapted for the preperation of Pyroxyline. The yellow *Nitrous Acid*, so called is a strong Nitric Acid partly saturated with the brown vapours of Peroxide of Nitrogen; it has a high specific gravity, but this is somewhat deceptive, being caused in part by the presence of the Peroxide. On mixing with Sulphuric Acid the colour disappears, a compound being formed which has been termed a *Sulphate of Nitrous Acid.*

In the Appendix a Table is given which exhibits the quantity of real anhydrous Nitric Acid contained in samples of different densities.

Chemical Properties.—Nitric Acid is a powerful oxidizing agent (see page 175 vol.8); it dissolves all the common metals, with the exception of Gold and Platinum. Animal substances, such as the cuticle, nails, etc., are tinged of a permanent yellow colour, and deeply corroded by a prolonged application. Nitric Acid forms a numerous class of salts, *all of which are soluble in water.* Hence its presence cannot be determined by any precipitating reagent, in the same manner as that of Hydrochloric and Sulphuric Acid

Impurities of Commercial Nitric Acid.—These are principally *Chlorine* and *Sulphuric Acid;* also Peroxide of Nitrogen, which tinges the acid yellow, as already described. Chlorine is detected by diluting the acid with an equal bulk of distilled water, and adding a few drops of Nitrate of Silver,—*a milkiness,* which is Chloride of Silver in suspension, indicates the presence of Chlorine. In testing for Sulphuric Acid, dilute the Nitric Acid as before, and drop in *a single drop* of solution of Chloride of Barium; if Sulphuric Acid is present, an insoluble precipitate of Sulphate of Baryta will be formed.

NITROUS ACID. *See* SILVER, NITRITE OF

NITRATE OF POTASH.

Symbol, $KO\ NO_5$ Atomic weight, 102.

This salt, also termed *Nitre of Saltpetre,* is an abundant natural product found effloresced upon the soil in certain parts of the East Indies. It is also produced artificially in what are called Nitre-beds.

The properties of Nitrate of Potash are described as far as nesessary at page 325.

NITRATE OF BARYTA.

Symbol, $BaO\ NO_5$ Atomic weight, 131.

Nitrate of Baryta forms octahedral crystals, which are anhydrous. It is considerably less soluble than the Chloride of Barium, requiring 12 parts of cold and 4 of boiling water for solution. It may be substituted for the Nitrate of Lead in the preparation of Protonitrate of Iron.

NITRATE OF MAGNESIA.

Symbol, $MgO\ NO_5+6HO$. Atomic weight, 128.

Nitrate of Magnesia may be prepared by dissolving Magnesia or its carbonate in dilute Nitric Acid. It crystallizes with difficulty in rhomboidal prisms, which are deliquescent and soluble in an equal weight of water. When intensely heated, it loses both water and acid, and Magnesia remains.

Commercial Nitrate of Magnesia usually contains *Chloride* of Magnesium, and if it has been strongly fused, *Nitrite* of Magnesia and Oxide of Magnesium; it will be better therefore to prepare it purposely for Photography.

A solution of Nitrate of Magnesia, of about the strength recommended by Mr. Spiller for preserving the sensitiveness of Collodion plates, may easily be obtained as follows:—Take five fluid ounces of a *colourless* sample of Nitric Acid of the common strength, sold at about tenpence per pound (sp. gr. 1·36 to 1·4) and dilute it with seven ounces of water; then weigh out Carbonate of Magnesia four ounces, and add it by degrees until all effervescence has ceased, *and an excess of Magnesia remains, rendering the liquid milky.* Next add the Nitrate of Silver advised in the formula, viz. twelve grains, which however may conveniently be increased to half a drachm; agitate well until a piece of reddened Litmus paper changes to blue on immersion, showing that the Bath is *alkaline,* and then filter from the white deposit and add the Glacial Acetic Acid, one drachm, as recommended (see page 248).

In this process, the Carbonate of Magnesia first neutralizes the Nitric Acid, converting it into Nitrate of Magnesia; the Nitrate of Silver decomposes any soluble *Chloride* which may be present, precipitating it in the form of Chloride of Silver, and also reacts upon the excess of Carbonate of Magnesia, producing Carbonate of Silver, which renders the Bath alkaline; lastly, the Acetic Acid removes the alkalinity, leaving in the liquid *a trace* of Acetate of Silver, thus giving absolute security against the existance of any free Nitric Acid, which would destroy the sensitiveness of the preserved plates.

The solution when completed will usually contain a small quantity of Soluble *Sulphate* (evidenced by Chloride of Barium); the precipitated Carbonate of Magnesia being rarely washed sufficiently to free it from all traces of Sulphate of Soda and Chloride of Magnesium or Sodium.

NITRATE OF LEAD.

Symbol, $PbO\ NO_5$. Atomic weight, 166.

Nitrate of Lead is obtained by dissolving the metal, or the Oxide of Lead, in *excess* of Nitric Acid, diluted with 2 parts of water. It crystallizes on evaporation in white anhydrous tetraheda and octahedra, which are hard, and decrepitate on being heated; they are soluble in 8 parts of water at 60°.

Nitrate of Lead forms with Sulphuric Acid, or soluble Sulphates, a white precipitate, which is the insoluble Sulphate of Lead. The *Iodide* of Lead is also very sparingly soluble in water.

(*To be Continued.*)

PHOTOGRAPHY—ITS RISE AND PROGRESS.

ARTICLE FIVE.

BOTH M. Daguerre and M. Nicephore Niepce seem to have relinquished all, or nearly all, interest in the development of their discoveries after their publication and the award of the pensions granted to them by the French Government. It is true M. Daguerre pursued his experiments for a time and made some new discoveries which he published; but they were of little practical advantage and therefore have never been adopted. In 1843 he published some remarks on the details of his process, and gave some further instructions in regard to polishing and coating the plate, and the nature and influence of temperature and air. The most important improvements, however, have emanated from other sources. M. Nicéphore Niepce died soon after the announcement of the discovery and we have no record of any further experiments by him, and his son, into whose hands the process fell, seems to have abandoned it entirely to M. Daguerre.

Since the date of M. Daguerre's last published note on the Daguerreotype (1843) the French have almost entirely derived their improvements from England and America, the most important originating with them being the discovery of M. Fizeau, already referred to, of coating the plate after fixing, with a thin film of chloride of gold. M. Martens is said, also to have made a very important discovery, by means of which proofs can be obtained with the quickness of a flash of lightning; but as he has, so far as we are aware, kept it a profound secret we cannot speak advisedly in regard to it.

The French *savans* have almost universally turned their attention to the paper processes, and in these branches they have given us a great variety of new methods and produced the finest results

In consequence of the limited amount of information published

as to the date of discoveries, it will be impossible to fix the time of most of the improvements introduced. We shall therefore be obliged merely to give the credit of them where due, without discussing the subject of priority where it is denied. All the improvements, so called, made in photographic manipulation, have been made since 1848. In that year M. Niepce de St. Victor first made application of albumen to glass, without the knowledge, it would seem, of its having been applied previously by Mr. Whipple of Boston. The discovery of Albumen as a sensitive film, with other substances of the same nature, is wholly claimed by the French ; but we think Mr. Whipple can fully substantiate his claim to priority.

M. Preschot, Dr. Berres and others discovered and proposed many modes of fixing, but as none have been found superior to that with the hyposulphite of soda solution they have not been adopted. M.M. Bayard, Becquerel, Evrard, Renard, Gaudin, Seguier and others introduced numerous modifications in the paper processes which tended greatly towards the advancement of the art, and the beautiful and perfect pictures—some of the extraordinary size of eight feet by two—constantly being produced by them deserve the highest meed of praise. M. Becquerel was among the first, if not the first, to produce naturally colored impressions. His discovery of the curious phenomenon of the continuating glasses deserve particular notice from the peculiar nature of the process.

It is a well established fact that the action of rays of light obstructed by any yellow, red, or orange medium are destroyed photographically and produce no effect upon the plate or paper in the camera ; hence the necessity of choosing clear or cloudy days for the production of photographs, or of substituting blue screens before the window of the operating room, as a hot hazy atmosphere is more or less yellowish. Notwithstanding this effect produced by light passing through yellow media, it was found by M. Becquerel, that, after partially impressing a sensitive surface with an image in the camera, that image could be fully brought out by simply placing the plate under a yellow, red, or orange colored glass.

" The red, orange and yellow rays, when acting on an unaffected surface, are considerably less capable than the most refrangible rays of imparting the affinity for mercurial vapor on both the iodide and bromo-iodide of silver ; and they destroy that affinity when it has been produced on the bromo-iodide of silver by the photographic rays. It follows from this fact, that when the red, orange, or yellow rays are more abundant in the light than the most refrangible rays, the photogenic effect is retarded in proportion to the effect of these antagonistic rays. This happens when there exists in the atmosphere some vapors which absorb the most refrangible rays. In those circumstances the light appears rather yellow ; but it is very difficult to judge by the eye of the exact color of the light, and of the proportion of photogenic rays existing in the atmosphere at any given moment.

"The vapors of the atmosphere which render the light yellow, act as any other medium intercepting the blue rays, and those which have the same degree of refrangibility.

" If we cover an engraving one-half with light yellow glass, and place it before a camera-obscura, in order to represent the whole on a daguerreotype plate, we shall find that during the time which has been necessary to obtain the image of the half not covered, not the slightest effect has been produced on the half covered with the yellow glass.

" Now if we cover one-half with deep blue glass, and the other with the same light yellow glass, the engraving will be seen very distinctly through the yellow glass, and not at all through the blue. In representing the whole, as before, on the daguerreotype plate, the half which was clearly seen by the eye has produced no effect ; and the other which could not be seen, is as fully represented, and in nearly as short a time as when no blue glass had been interposed.

" Thus we might construct a room lighted only through an enclosure of light yellow glass, in which light would be very dazzling to the eye, and in this room no photographic operation could be performed ; or a room enclosed by a deep blue glass, which would appear very dark, and in which the photographic operation would be nearly as rapid as it would be in the open air.

" Thus we may conceive certain states of the atmosphere under which there will be an abundance of illuminating rays and very few actinic rays ; and some others, under which the reverse will take place. Considering how difficult it is to judge by the eye, alone of the chemical state of light, we can understand why the photographer is constantly deceived in the effect he tries to produce, having no means to ascertain beforehand, with any degree of certainty, the intensity of light." (*Hunt.*)

The knowledge of these facts are of great importance to the photographer, much greater than many of the daguerreotypists in this country seem to admit. Our atmosphere, particularly at the south, frequently changes from photogenic to non-photogenic action in consequence of the development and dispersion of a yellow haze and the application or withdrawal of a blue glass medium for the purpose of meeting these changes would render the work of the operator, in many instances less onerous.

The introduction of the acid and alkaline hyposulphite baths for the purpose of changing the color and tone of the photographic pictures, introduced by M. Evrard, is another decided improvement.

One of the greatest difficulties under which the photographer labored was the imperfection of paper. Up to 1851 that used was either too porous, badly sized, or too full of holes, black specks and water lines. Several paper manufacturers set themselves to work to remedy this evil, and it is to the French manufacturers Canson fréres, Saxe and Marion we are under obligation for the beautiful articles now in use.

With the improvement in paper various modification were introduced into the paper processes, one of the most important being the waxing of the negative paper, introduced by M. Gustave Le Gray. This improvement rendered the obtaining of large views much more easy and certain, and to it we principally owe the beautiful landscapes and views of ancient ruins, and modern buildings which are now claiming the attention of *conoiseurs* in fine art matters.

From the discovery of photography the idea of obtaining photographs in the natural colors occupied the minds of nearly all the experimentalists in the art. Daguerre and others succeeded in obtaining fleeting impressions of various colors by the use of phosphates, but failed to secure a combination of them all. On the 4th of March 1851, M. Niepce de St. Victor deposited in the Academy of Sciences at Paris, a paper describing a process by which, he claimed the ability to produce the image of a natural object in primitive colors, at the same time expressing his regret that he had not yet succeeded in permanently fixing them.

Owing to the announcement of Mr. Hill, in this country, that he had discovered a method of copying nature, by the daguerreotype, in all the gaudy and lively colors in which she is dressed, M. Niepce de St. Victor was induced to publish his process much earlier than he had intended. As considerable interest has always been evinced in this subject by the public, a few extracts from M. Victor's memorial will undoubtedly prove interesting. M. Victor says :

" Having formed the idea from what I observed, that there might exist a relation between the color that a substance communicates to a flame, and the color that light produces upon a plate of silver which has been chlorodized with the substance which colors that flame, I undertook the series of experiments which I am now about to submit to the Academy.

" The bath into which I plunged the silver was formed of water saturated with chlorine, to which I added a chloride which possessed the property of giving the flame the color which I desired to reproduce upon the plate.

" It is known that the chloride of strontium imparts a *purple* color to flames in general, and to that of alcohol in particular.

" If a plate of silver be prepared by plunging it into water saturated with chlorine to which chloride of strontium has been added and the surface of a picture colored in red and other colors be then applied to the plate, and exposed to the light of the sun, after ten or fifteen minutes, it will be remarked that the

colors of the image are reproduced on the plate, but that the red is much more decided than the other colors.

"When it is desired to reproduce successively the six other rays of the solar spectrum, the same course is pursued that has been pointed out for the red ray by employing for *orange* the chloride of calcium, or that of uranium; for yellow the hypochlorate of soda, or the chloride of sodinm, or of potassium as well as pure liquid chlorine ; for if a plate of pure liquid silver is plunged iuto liquid chlorine for some time and then exposed to the flame of an alcoholic lamp it produces a beautiful yellow flame.

"If a plate of silver be plunged into liquid chlorine, or exposed to its vapor (but in this latter case the ground of the plate remains always dark, although the colors are produced,) all the colors will be developed by the action of light, but the yellow alone will possess brilliancy. I have obtaiued a most beautiful yellow by means of a bath comprised of water slightly acidulated with hydrochloric acid and holding in solutiou a salt of copper.

"The *green* ray is obtained by means of boracic acid or chloride of nickel, as well as by all the salts of copper.

"The *blue* ray is produced by the double chloride of copper and ammonia.

"The *indigo* ray with the same substance.

"The *violet* ray is procured by the help of chloride of strontium and sulphate of copper.

"In fine, if alcohol slightly acidulated with hydrochloric acid be set on fire there results a yellow, blue aud yellow flame, and if a plate be prepared with water acidulated with hydrochloric acid, all these colors are produced by the action of light ; but the grouud of the plate is always black, and this preparation of the plate cau ouly be made by the action of a galvanic battery.

It appears, therefore, that all the substances that produce colored flames yield also colored images under the action of light.

"If I now take all the substances which give no color to flame, I shall likewise produce with them images uncolored by light; that is to say, a negative image alone will appear on the plate, with no colors but black and white, as in ordinary Photography.

"Certain substances yield white flame, as the chloride of antimony, the chlorate of lead, and the chloride of zinc. The first two give a bluish white flame, and the last a white flame feebly tinged with green and blue. These three chlorides yield no colors by light if we use them alone ; but if we mix them with other substances, which do produce colors, we obtain in addition white grounds ; a thing very difficult to obtain, from the fact, that, properly speaking, there exists no black or white in the phenomena of coloration ; and when I have succeeded in obtaining it, it is ouly by means of chloride of zinc, or chlorate of lead, which I add to my baths, though only in very minute quantities, as they hinder the production of colors.

"I have reproduced all the colors of a copy by preparing the plate in a bath composed of deuto-chloride of copper. This result, it appears to me, is explained by observing the fact that a flame of alcohol or of wood, iuto which chloride of copper has been thrown, exhibits not only the green, but all the other colors of the spectrum in succession ; the same pheuomena occur with almost all the salts of copper mixed with chlorine. * *

"I give in my memoir the composition of the baths with which the silver plates are prepared ; but as they are very numerons, and as I have not yet described all the combinations that I have made, I have selected two or three of them, which I deem preferable, especially for preparing the plate without the use of the battery.

"I have already said that liquid chlorine acts npon a plate of silver by a simple immersion and gives all the colors ; but they are feeble (with the exception of *yellow*); this arises from the fact that the coating is too slight, and cannot be rendered thicker without the aid of the battery.

"If a salt of copper be put into the liquid chlorine, a very thick coating will be obtained by a simple immersion ; but the mingling of copper and liquid chlorine always acts badly. I prefer to take some deuto-chloride of copper to which I add $\frac{3}{4}$ of its weight of water. These both give very good results : there is, however, a mixture which I like better still. It is to put equal parts of chloride of copper and chloride of iron with three-quarters of water. The chloride of iron has, like that of copper. the property of acting upon the silver plate and producing several colors ; but they are infinitely more feeble, and it is always the yellow that is most decided ; this is in accordance with the yellow color of flame produced by the chloride of iron.

"If a bath be formed composed of all the substances which separately give a dominant color the colors will be obtained all very vivid, but the great difficulty is to mingle them in proper proportions, for it almost always happens that some colors are excluded by others, though I doubt not we shall succeed in reproducing all.

It is proper to remark that very great difficulties stand in the way of producing the colors, more than in all the other processes of photography ; for although the plates be prepared in the same manner ; one is not always sure of obtaiuing the same results. This arises, among other things, from the thickness of the coating of chlorine, and from the degree of its concentration, which varies according to the chlorides that are employed.

"The iufluence of water is incontestable, since dry chlorine does not produce any effect, while if we employ liquid chlorine by immersion, or in aqueous vapors, we obtain the reproduction of all the colors as has been described.

"In the relations which I think I have remarked, betweeu caloric and the effects of light, I have observed the following ; that is, that when the plate has been submitted to the action of chlorine it is necessary to heat it over a spirit lamp and it takes then successively all the tints produced by heat. Thus the plate which on issuing from the bath has a dull color, takes successively under the influence of heat, the following tints : *reddish white or tinted white ;* iu this last state it no longer produces any effect on being exposed to the light ; it should be brought only to the cherry red color.

"It is a remarkable fact, that to obtain these effects of coloration, it is absolutely necessary to operate ou metallic silver, prepared as I have mentioned ; for the acetate, the chloride, and the sulphate of silver spread upon paper, gives only black aud white impressions. Perhaps in employing the precipitate of silver mixed, with the substances. I have pointed ont, some favorable results might be obtained from it, by spreading it upon paper—this is an experiment I propose to make. I have already tried silvered paper, which gave me pretty good results, but inferior to the metallic plate.

"We have seen that all the substances which give colored flames give also colored images, and almost always in connection ; for if I have not succeeded in isolating a ray completely, that is to say, in obtaining only a single color on the plate to the exclusion of all others, I have always obtained a dominant color, according to the substance which I employed ; and if a color cannot be obtained *alone*, it is because chlorine, which is indispensable to the operation, produces all the colors of itself, as we have seen in workiug with pure liquid chlorine ; but in this latter case the colors are always very feeble, while they assume individually great brilliancy, according to the snbstance which is used in making the mixture, with chloriue.

"Iodine and bromine, in that respect, very different from chlorine, cannot be employed ; neither the one nor the other produce colors ; they do not yield colored flames ; eveu when combined with copper they give only a green flame. Chlorine, in the state of chloride or chlorate, is the only substance which gives to metallic silver the property of reproducing colors under the action of light.

"I have observed, also, that certain colors were mnch longer in making their appearance, and that meanwhile others had disappeared."

* * * * * *

"Now, after the facts I have observed, it certainly appears that, if there is not a *complete similitude* between the different colored flames and the colored images obtained by light on a silver plate prepared with the chlorides or chlorates which color

the flames, there is, at least, a great analogy between these two colors."

In subsequent memoirs M. Niepce de St. Victor has indicated several modifications and improvements which still nearer approach the perfection at which he aims. He has succeeded so far as to obtain the impressions of colored engravings, and of flowers in their natural colors and of retaining these impressions for some time—in fact, it is said, he exhibited several at the Worlds' Fair, in London, in 1852, which were of great brilliancy and perfection—but as yet he has not succeeded in permanently fixing them.

Those who have seen the results of M. Niepce de St. Victor seem to entertain lively hopes of his ultimately succeeding in accomplishing the, at present, most desirable end of obtaining photographic pictures from nature in all her lively hues.

Another branch of Photography to which M. Victor has turned his attention for the last three years bids fair to a speedy accomplishment. It is that of *engraving upon steel* photographically impressed.

It appears that both Mr. Talbot of England and M. Victor of France, pursued separately, but at the same time, investigations in furtherance of this object. The first published account of any process for photographic engraving, however, was made by M. Victor, through a communication by M. Arago, in *Comtes Rendus*, Aug. 19, 1839. Mr. Talbot followed in a communication to the *London Journal of the Photographic Society* in June 1853. The processes given in these two communications are quite different, and the results now obtained show conclusively the superiority of that of M. Victor. As we shall hereafter speak of this process, we will now merely remark, that M. Victor has brought his invention to such a state that, by it, steel plates are engraved, and with slight retouching, can be embodied in a page of type and printed, in the same manner as a wood engraving.

Were we to enumerate all the improvements that have emanated from French photographers it would occupy more space than could be spared ; we must therefore close with the remark, that to the French we are indebted for many of the most valuable improvements, and the most beautiful results in photographic manipulations.

From the Journal of the Photographic Society.

PHOTOGRAPHIC PROCESSES.

GLYCERINE FOR PRESERVING COLLODION IN A SENSITIVE CONDITION.

To the Secretary of the Photographic Society:

Dear Sir,—A short time ago my friend Mr. Maskeleyne sent me from Oxford a sample of glycerine, with a recommendation that I should try it as a substitute for honey in the preservation of excited collodion plates.

I immediately commenced an extended series of experiments, but owing to the unfavourable condition of the weather, and to the want of sufficient time to verify the various results, I have not yet been able to establish a formula that I can offer with due confidence to the Society.

In every new branch of experimental research a great variety of trials are necessary, and a prolonged experience is required to test each separate step of proceeding.

This I have not yet had sufficient leisure to attain, but I am induced to send the accompanying specimens, from collodion negatives prepared in the morning and developed at night, and produced under triple strata of November clouds, as examples from which others may judge of what glycerine is likely to effect, and which may induce them to join me in this interesting branch of photographic experiment.

The extreme case with which glycerine unites in all proportions with water gives it a marked superiority in this respect over honey, while its inevaporable nature and its chemically neutral condition will point to its probable advantages as a preservative agent in collodion work.

I may here observe, that in all my experiments I have found the manipulations of the easiest kind, and they involve no necessity for any additional apparatus.

For my part I shall continue my experiments, and hope to establish certain formulæ that may be entirely depended upon, and an exact *madus operandi*, to present to the next meeting of the Society.

J. D. Llewelyn.

GUTTA PERCHA COLLODION.

To the Editor of the Photographic Journal:

Sir,—I am unable to give F .C. further information regarding the use of gutta percha collodion than that contained in the following extract from the original communication which appeared in the *Athenæum* of 17th January 1852:—

"Although gutta percha does not readily dissolve in ether or collodion, it does so sufficiently for the purpose required, viz. for giving a firmness to the collodion plate, and enabling the operator, after blotting the surface with bibulous paper, to immediately take a positive from a glass negative by gass-light, in less than five seconds. If the collodion mixture is put in a gutta percha bottle for a day or two it will have imbibed sufficient gutta percha for the purpose required."

The manipulation with the mixed solution was in every respect similar to that adopted with ordinary collodion; but I cannot give the exact proportions of the ethereal solution of gutta percha that was added to the iodized collodion. It was about one-third.

From illness and other causes, I have had little or nothing to do with collodion for the last two or three years; but at the time referred to, in my hands the addition of gutta percha to Messrs. Horne and Co.'s collodion, not only rendered the collodion film very tough, but extremely sensitive, exemplified by its bearing the superfluous nitrate of silver being blotted off with bibulous paper, thereby enabling me to take instantaneous positives by gass-light, and also, as stated in "Thornthwaite's Guide to Photography," to take, at the Royal Institution, positive portraits by the discharge of a single Leyden jar, as witnessed by Dr. Faraday, Sir William Snow Harris, and others.

I am, Sir, Yours truly,

P. W. Fry.

Ta the Editor of the Photographic Journal.

Sir,—May I be permitted to retract an error of judgment that I made in your last Number, with regard to *transmitted* v. *paper positives*? I now think that the advantage of a little purely transparent, not body, color on certain kinds of paper prints —*in every case* to be mounted behind an albuminized glass, as shown by Mr. Sutton in his calotype process—is preferable to the extreme sharpness of the transmitted picture: color is a relief, but the effect of light must be undisturbed. It is agreed that *it is in the surface nature of the impression that the superiority exists:* the short consideration, and every photograph now being produced has an intrinsic and will eventually possess a great degree of *historical interest*, should constrain us to make it as sharp as possible, and to this end paper of the *smoothest texture* must be used. We do not want to call this an artistic print, though it is likely it might be so; but we can give a broad effect to another by interposing a sheet of paper between it and the negative. I infer that no *camera picture* should be out of focus in any part. Daguerreotypes form unquestionably the most perfect stereoscopic image, and to them these prints under glass nearly approximate.

Undoubtedly perfection in the proof is the one great object in which all our united endeavours are concentrated.

And if, in this latter view, the foregoing remarks have any interest or in any way seem to excuse your judgment of their author and merit a place in your columns, it will gratify and afford additional pleasure to Your obedient Servant,

Charles Heckford Bennington.

From the Journal of the Photographic Society.

Mr. T. S. ARCHER'S PATENT PROCESS FOR TRANSFERRING COLLODION PICTURES FROM THE GLASS PLATE ON TO GUTTA PERCHA.

Read before the London Photographic Society, Dec. 6th, 1855.

THE process I am about to introduce to your notice is the result of my endeavours to obviate one great impediment to the working of the collodion process, namely the risk which the photographer is subject to from the weight and brittleness of the material on which he works. Many of our ablest photographers are, I believe, deterred from practising this process when abroad and on journeys from this cause alone. They feel obliged to content themselves with a process less simple in its manipulation, and less delicate in its results.

My earliest experiments with collodion led me to hope that this very film itself could be made not only the vehicle for the picture, but also to have sufficient strength and thickness to bear removal from the glass, without farther support in the after process of printing.

In this however, I was disappointed ; for although collodion can be made in sheets of great toughness and durability, it has one defect arising from its great contractility, which increases in proportion to its strength ; so much so, that I found from this peculiar property, that a film when dry would shrink at least one-fourth from its original dimensions, and this with such irregularity as to render it of no practical use.

I next endeavoured to meet this difficulty half-way, by having the iodized collodion strong enough to bear removal from the glass after the picture was obtained, to be replaced on glass again when my day's work was done, or on my return from my excursion, at whatever time it might be.

This plan of course saved me the carriage on a trip of any large stock of glass, and was perfectly practicable ; still it required more patience than could be commanded even by the most skilful and persevering operator.

Another plan to obviate the necessity of carrying a large stock of glass, was to remove the film on to gummed paper ; but this, although more easy than the first, was returning to the imperfections of paper photography, with regard to printing through the course texture of the paper.

After the failure of these plans, my attention was directed to the possibilty of finding some substance, which, although not capable of being used as a substitute for collodion, might be useful in an after process for supporting the collodion picture. I again set to work with this object in view, and numberless were the trials I made.

The result has been the working out of the process I am now about to offer to your notice. Its capabilities will very soon be tested by numerous photographers, and my hope is that it will be found to meet in every way the difficulties to which I before alluded.

I will now proceed to the subject in hand. The chemical nature and properties of the substance I employ (gutta percha) are too well known for me to dwell upon. It is tough and elastic, insoluble in water, soluble in various menstrua which leave it on evaporation unchanged in any of its chemical properties, producing, when poured on any smooth substance, a film possessing all the well-known properties of gutta percha. The question now was, how to apply these sheets of gutta percha, or to attach them in some way to the collodion film. The first plan that suggested itself was, the cementing the gutta percha film already prepared, on to the finished collodion picture ; but this had many difficulties, and was soon laid aside. The next plan was, pouring the gutta percha film on to the glass first, and when the skin was dry, pouring on the iodized collodion and proceeding with the process in the usual manner. This again was put aside ; for it was attended with disadvantages which I readily perceived would render it inefficient. In the first place, that if the picture were not successful, the gutta percha film and the collodion were both lost, besides the time wasted in preparing the plates; and secondly, the difficulty, if not the impossibility, of preparing the surface of this gutta percha skin so perfectly free from blemishes as is absolutely necessary to receive the collodion film. Another difficulty was, the rediness with which these combined films separated from the polished surface of the glass during the working of the process. This was remedied by the application of the solution to the edges of the glass with a brush. Another plan, and the one I shall presently describe, is to prepare the collodion picture in the usual manner, and when dry, to pour on the solution of gutta percha.

I must confess that I had great doubts of the success of this plan in my first trial with it, for I immagined that there would be great difficulty in making the two films adhere sufficiently firmly to each other, and doubted whether the collodion film would in all cases separate from the glass. My doubts on this point were soon dispelled, and I have never had one single instance in which the combined films did not separate most readily from the glass. This last plan will therefore be the one I shall make known to you this evening. It is equally applicable to pictures that have been varnished, provided all the grease has been removed from the surface of the varnish, which it sometimes acquires by repeated handling of the negatives. This grease is easily removed by gently warming the plate and pouring over it a little spirits of wine, and again gently warming until dry.

We now come to consider the best solvent for gutta percha. I prefer pure benzole; it is very volatile, and has no unpleasant smell. Bisulphuret of carbon is out of the question. Coal-oil would answer, but its unpleasant smell and less volatility are against its use. Chloriform, the best solvent of all for gutta percha, dissolves it readily in the cold, and does not become crystallized at a low temperature. These qualities render it desirable in most respects, but I cannot recommend it, for two reasons: the first is the effect it would produce on the operator when inhaled in large quantities; the second is, that all dust and impurities it may contain rise to the top of the liquid, and are consequently liable to be poured on the plate. Pure benzole, as I have said before, is the best solvent. The commercial article has generally the taint of coal-oil. The films produced with it have when drying the unpleasant odour of the latter article. Pure benzole, on the contrary, has no unpleasant smell, and the films when drying have the odour of almonds, which they often retain for a considerable time.

We now come to the application of the solution of gutta percha in benzole. This may be effected in several ways. The glass plate can be immersed in a bath of the solution, or placed on the surface of the liquid contained in a shallow pan or porcelain dish. By either of these methods the plate may receive two or more coatings of the solution, taking care to dry between each application. But I prefer holding the plate horizontally with the hand or on a levelling stand, and pouring on to the middle of the plate a quantity of the solution; it will speadily spread itself, and should be assisted in its way toward the corners by a glass rod or a thin piece of wood. When the plate is covered, it should be allowed to remain perfectly stationery for a minute or more, according to the thickness of the solution, but not long enough to become chilled on the surface. The glass is then *very* gently inclined, to allow the superfluous liquid to return through the funnel into the bottle. The inclination of the plate is now gradually increased until it is raised to the vertical position over the funnel. The thick solution at the two lower sides is now assisted in its progress by passing the rod or piece of wood down the sides. If the first coating is not thick enough, a second may be applied. The plate is now to be warmed very gently at the back. If a fire is at hand it may be held before it, but on no account must the plate be overheated, or heated more than is absolutely necessary to prevent chilling, and to set the gutta percha. It should not be allowed to become chilled, or to set without heat, with the intention of melting it afterwards to render it transparent. This would cause the gutta percha to become sticky and adhesive, and would be likely to impair its durability.

If there is no fire convenient for the purpose, a gentle heat may be obtained by means of a spirit-lamp applied in conjunction with the little apparatus I have with me. It is a copper dish set in a wooden frame, and mounted on four moveable legs.

The copper dish is hollowed in the centre to contain a small quantity of water. The top is covered in with a thin slab of slate. The glass is now put on one side until cold, this will take about ten minutes; while this is drying, other plates are brought forward to be coated in the way directed. The next step is to place the plate in a vessel of cold water, to remain there from five to ten minutes, or, in fact, until the picture separates easily from the glass. The picture is placed between blotting-paper to remove the moistnre; the rough edges are cut off; the negative is then ready for the printing frame.

The weakness or strength of the collodion film is a matter of no consequence.

I have thus gone through the whole details of the manner of removing the collodion picture, with, I hope sufficient minuteness to give you a clear idea of the subject. That it requires care and some little practice is evident; it will not however be difficult to those who are accustomed to prepare collodion plates, and will I feel sure, amply repay the trouble of the operator.

[The author appended to this paper some observations calling in question any claim to originality for the paper read at the last meeting of the society by the Rev. Mr. Reade.]

Chairman:—Mr. Archer was kind enough to bring me, some days ago, a few of the negatives prepared by him, in order that I might try whether they would answer for the negative process; and I found them answer every purpose. I have to-day taken off half a dozen in the course of half an hour, and the result was perfectly successful.

Mr. Wilkinson—I accidentally made a discovery in the course of some experiments on this subject, which may be useful in the taking of positives. I poured ordinary Brunswick black over collodion, and allowed it to remain upon the plate for two or three days till it was perfectly dry; then wanting to use the plate, I threw it into the water, and it came off in a single sheet, leaving the glass perfectly clean.

From Notes & Queries.

SINGLE STEREOSCOPIC PICTURES.

In the discussion upon this subject, Mr. C. M. Ingleby takes exception to some expressions as *ambiguous* and *inoccurote* that have been used by me. On reconsidering them, my judgment admits a part of the allegation, as far as *languoge* goes; the facts I endeavoured to point out were probably described in phraseology of too loose a description, and I am therefore justly open to the rebuke I have received.

"An observer" is certainly not a mathematical point; by this phrase I meant the *centre of an observer's eye.*

All parts of a *plane* surface are not, and can never be *equally distant* from any centre—but the assertion made by me on this point was stated to be *approximately true* only. Even this is probably too strong a term to apply to the case under consideration—the mental idea uppermost at the time being, the corresponding condition of the plate in the camera with reference to the focus of the lens. Now, *absolutely*, a small " annulus" only of the plate is in focus at once, the union of all the focal points forming a portion of the periphery of a sphere, or other curved solid; yet a small portion of such periphery deviates from the plane to such an extent only as admits of our considering it to be all "in focus" and using it accordingly in taking a photograph.

Hence, by analogy, I considered myself justified in the statement "that the axes of both eyes would converge uniformly if brought to bear upon any part of the picture" as acurate enough for the illustration. If I have used too great a latitude of expression in this case, it was from an error in judgment upon the admissibility of such illustration, not from any absence of knowledge of the facts. I am satisfied that Mr. Ingleby agrees with me in *substance*, but he is kindly correcting a vagueness of expression. I should have said that the convergence of the optic axes, when directed to the various parts of a single picture, differs *so little in extent*, that the fact of its being a plane surface under inspection is revealed; while with two properly depicted photographs in the stereoscope, the *corresponding portions* of the two pictures *not* being in *all ports uniformly* distant from each other, the adjustment of the optic axes, in order to observe simultaneously each corresponding pair of points in succession, has to be altered to an extent considerably exceeding that prevalent when a plane surface is being examined; hence the idea is suggested that it is *not* a plane surface.

Geo. Shadbolt.

The communiction of M. U, (Vol. xii., p. 351.) respecting the subject of single stereoscopic pictures, requires a few remaks in reply.

In the first place, M. U. states that I am mistaken in supposing that a picture taken by the method suggested by me would be stereoscopic, or that it would differ from any ordinary picture; but that the picture would be stereoscopic if viewed with *one* eye only.

Before proceeding farther, I may here state, that the experiment has hitherto been made only with the camera, and that which I have previously written respecting the stereoscopic effect has only had reference to the picture on the glass screen.

But that the picture on the screen is stereoscopic is a fact beyond all dispute, however hard this may clash with the theory of the stereoscope. I should also imagine that if the proper effect is produced on the screen, it is equally possible to produce the same on a prepared plate.

Moreover, the picture is stereoscopic *only when received with the two eyes*, and not *with one*, as suggested by M. U. The reason why I have not obtained a photograph by the plan, is simply because the two pictures do not coincide in all their parts alike, which spoils the effect by producing everything double when imperfect. Let me recommend the experiment itself to be tried and if the directions are followed as suggested in my first communication, the stereoscopic effect (at present denied by so many) will be evident in a moment, even to the most sceptical on the subject.

Geo. Norman.

From the Jour. of the Phot. Soc.

SIR W. J. NEWTON'S PRINTING PROCESS.

To the Editor of the Photographic Journal:

Sir,—In answer to Mr. D. Ross' question contained in the last number of the Journal, I have to observe in the first place, that I dissolve 50 grains of nitrate of silver in one ounce camphor-water, too which I add one drachm and a half of glacial acetic acid, and dilute to the strength I require with camphor-water (*both for negatives and positives*): one part water will give 25 grains; two parts nearly 17 grains; and three parts a little more than 12 grains of nitrate of silver.

The next question is, as to how soon the paper may be used after it is excited, without "spoiling the negative." Generally speaking, I use it immediately after I have blotted it off, so that it is free from any appearance of being *wet*; but I do not recommend this for general adoption; it is better to prepare half a dozen or more at a time and place them *separately* between *each* leaf of a blotting-paper book, (I adopt this mode for negatives also,) and then to begin with the first excited. I have never had occasion to keep them for any length of time after being excited, but I should think they would keep for two or three days or more, according to the heat of the weather.

As however I cannot imagine that, under any circumstances, it would be necessary to keep them so long, I have therefore only to observe that it is always better, and safer, to expose and develope as soon as possible after the paper is excited.

With respect to the omission of gallic acid in the first preparation of the paper, by exciting with "gallo-nitrate of silver" instead, I have to observe that I have frequently tried this, and with the same good result; but the paper is much more certain, and keeps longer, if prepared as I have described, because there is no occasion to mix the nitrate of silver with the gallic acid

until you are actually exciting the paper, and we all know that when they are combined in a liquid state, they very soon decompose.

I have not the Journals here to examine, therefore I cannot determine the "simple process" referred to in vol. i. page 222, but I am well aware of the change of color which Mr. Ross has described, upon immersing the positive in hyposulphite of soda. This is invariably the case, notwithstanding its previous "splendid neutral tint," if aceto-nitrate is not immediately applied after the gallic acid has been spread over with the glass rod; the fact of the aceto-nitrate acting with the gallic acid (*as with a negative*) during the whole of the developing process, has the effect, not only of giving the color, (that of a print, if not exposed to the light too long), but so fixes it, that hyposulphite of soda will not change the color or weaken the positive, if it is not allowed to remain longer than is necessary; and notwithstanding the observations which have been made as regards the use of alum, I have always found that the effect has been not only to remove the redundant chemicals, but assist in rendering the fixing of a permanent character. As I have before observed, I do not pretend to account for this, chemically: I only state the result of long experience.

In the last Journal, I have stated, that, for French paper, I have omitted gallic acid in the first preparation, and that I wash it over, when dry with one drachm of a saturated solution of gallic acid filled up to an ounce with camphor-water (in this state I believe it will keep for a long time), and that when it is perfectly dry, I excite with 25 grains of aceto-nitrate of silver, which strength, I find to be, generally, better for French paper; but for English paper I see no occasion, at present, to change the manner of preparing it as pointed out in the July or August number, although I am well aware that in the course of practice a better mode may be discovered.

I will merely add that I am desirous of making use of the French paper, for positives, because I find that the half tints are more perfect, and in short, more is obtained from the negative, than by English paper; still I am not quite satisfied with French paper; as respects the want of brilliancy, vigour, and transparency in the shadows, but which I hope ere long to render certain.

"Theta" wishes to know where he "can get a paper fit for the Calotype process," the best I am acquainted with is that which he has named, to be purchased of Mr. Thomas, and also of Mr. Halifax, Stationer, Oxford; the papers are of the same make, but Mr. Thomas' is a year older, and, on that account, better; I have tried them both, and obtained very good results, but certainly not equal to my own paper, made by the same firm in 1847, of which I have the good fortune to possess nearly a ream and a half.

Yours truly,

W. J. Newton.

The Electricity of Gutta Percha Films.—I must apologize for troubling you in so trivial a matter, but while experimenting with the gutta percha film, produced in my process for the preservation of the sensitiveness of the collodion plate, I have been frequently annoyed by the electrical condition of the coating, after it has been dried and placed between folds of paper in the portfolio. It is perfectly astonishing how easily the electricity is excited, and equally so with what tenacity it adheres to the surfaces of the film; the mere friction of the hand, in the act of smoothing the negative, being quite sufficient to develope a high charge, which renders it impossible to handle the picture with anything like safety. And as I think it quite possible that others interested in the matter may be inconvenienced from the same cause, I ventured to prepare a remedy both simple and perfect. It is this: instead of placing the picture, when dry, between folds of paper, enclose it between leaves of *tinfoil*, which, from its power of conduction, will carry off any eletricity that may be excited by rubbing or handling the film, as soon as it is developed.

Charles A. Long.

ON THE EFFECT OF CERTAIN OXIDIZING AGENTS ON PHOTOGRAPHIC PRINTS.

BY T. F. HARDWICH, ESQ.

Read before the London Photographic Society, Dec. 6th, 1855.

Gentlemen,—The Council of your Society having placed a sum of money at my disposal for the purpose of defraying the expenses of a further investigation into the causes of the fading of positive prints, I have entered upon a course of experiments which I trust may throw additional light upon that subject.

I propose to communicate to you the results I obtain, in a series of papers to be read at the Society's meetings from time to time. This course will, I think, be better than that of waiting until the whole investigation is complete; under which circumstances the report from its greater length might perhaps become somewhat confusing.

This evening I wish to submit to your notice the results of some experiments made in treating paper positives with powerful oxidizing agents. The subject of the oxidation of positives will, I trust, prove to be interesting; because, although the Printing Committee appointed by your Society have not in their first report been able to speak definitely of any agent besides *sulphur*, likely to be a common cause of fading, yet on examining collections of old photographs we occasionally meet with facts which do not appear clearly explained on that supposition. I allude particularly to those cases in which positive prints which lasted well for a long time after their first production, afterwards faded away gradually in the course of years, or died out more rapidly on exposure to moisture. It is true that the atmosphere of many localities, and possibly of all, contains traces of sulphur compound, but whether in quantity sufficient to produce the effect under the circumstances (when for instance the prints are kept in a portfolio with imperfect access of air), admits of question.

Another cause has suggested itself to my mind as likely to produce fading, viz., the absorption of atmospheric oxygen by the prints under certain conditions: we know that paper positives properly purified in the first instance from redundant chemicals, will remain unaltered for years if kept in a dry place; but is it not possible that the presence of a little *size* in the paper, containing both animal matter and starch, and therefore susceptible of an *acid* fermentation, or the use of paste in mounting, which is still more likely to generate a free acid, might so alter the state of things, that oxidation, difficult before, became facilitated?

In order to test the probability of this supposition. I took strips of sensitive paper which had been darkened by light and subsequently fixed and washed, and placed them in closed tubes containing moist oxygen gas obtained by the voltaic decomposition of acidified water.

At the expiration of a fortnight or three weeks there were evident signs of commencing oxidation; certain of the papers had become pale and faded. whilst those which had been toned by sulphuration were turning yellow. This experiment, although nor quite satisfactory, inasmuch as some of the strips appeared to escape the action*, was yet sufficiently so to suggest its repitition on a larger scale and with a longer time allowed for its change. Meanwhile it seemed desirable to study the behaviour of the paper photographs when treated with oxidizing substances of greater power.

Nitric acid was the first agent selected. If applied in a concentrated form, it acts immediately upon the darkened surface and dissolves it.

A solution of *chromic acid* is more active than nitric acid. Even when greatly diluted it quickly eats away the picture, the solvent action usually commencing at the corners and edges of the paper and advancing towards the centre. If the print has been toned with gold, the phænomena are somewhat different, as will be shown in a later part of this paper.

* It is possible that whilst decanting the oxygen gas into the tubes a trace of the acidified water may have passed in, since, on subsequent testing, an acid reaction was manifest in the tube where the bleaching effect was most marked.

Peroxide of Hydrogen obtained in solution, and in conjunction with acetate of baryta, by adding peroxide of barium to dilute acetic acid*, bleaches the darkened paper; but the action is slow when compared with that of the two last-mentioned agents, and does not take place to a very perceptible extent if the liquid is kept alkaline to test paper†. It will therefore perhaps be more correct to say that peroxide of hydrogeu, in conjunction with a slight excess of acetic acid, produces a gradual fading effect.

A solution of *permanganate of potash* is an energetic bleacher of positive priuts, and as it is a neutral substance, it appeared better fitted than any other for use in the proposed experiments. The solution must be extremely dilute; about 1 grain of the crystalized salt may be added to the gallon of distilled water, which will give the liquid a perceptible piuk tinge. The fading action on the print then goes on slowly, and can be more carefully watched. The course which it seems usual to take is as follows:—At the expiration of about fifteen or twenty miuutes, the time varying with the degree of dilutiou, the print begins to appear darker iu colour, and soon after a whitish line forms at the edges and corners, extending by degrees inwards towards the centre. The half-tones next fade out, and eveutually the full shadows; but these last, if originally intense, and especially if *bronzed*, retain their blackness for comparatively a long time. The fact of the oxidizing action commenciug at the edges and corners of the print, may be unimportant; but it is noticed because the same fact is commonly observable in old photographs which have faded out by long keeping.

Having obtained a couvenient oxidiziug agent, neutral in constitution, I proceeded to prepare a variety of positive prints by different methods, and on mauy kinds of paper, expecting to find characteristic points of difference between them, as regards their capacity of resisting oxydation. The result fully bore out this idea, as the specimens which I lay upon the table for your inspection will show.

The plan was, first to wash the prints in boiling water, in order to extract the size and the last traces of hyposulphite of soda; then to divide them into halves, one set of which was immersed in the permanganate solution, the other being reserved for comparative inspection. At the expiration of about two hours, the oxidizing liquid was poured off, and the proofs washed, dried, and mounted in juxtaposition with their corresponding halves. They may therefore be compared with each other, having all beeu subjected to the fading action for a similar length of time.

You will see at once that they exhibit great differences; the effects of the oxidizer being more manifest in some cases than iu others. Certain prints are destroyed and useless, whilst others have suffered but little change.

The general statment of the results obtaiucd is as follows:—

Developed prints prepared by what is termed a negative process withstand the actiou better than others. But to this rule there are some exceptions;—much seems to depend upou the time of exposure to light, and the exteut to which the development is carried. Upon one of the cards are mounted six specimens, which illustrate this. The three in the top rank were developed on paper prepared with iodine, bromide, aud chloride of silver respectively, the exposure to light being very short, and the development pushed to a considerable extent. These prints are dark in colour, and vigorous in the outline; the contrast between lights and shadows is strongly marked. The corresponding three in the lower rank were a little over-exposed and under-developed; consequeutly they lost their dark colour in the hyposulphite fixing bath, and are now *reddish* and comparatively faint; they are what photographers sometimes term " all half-tone, " without any depth of shadow. Now prints of this kind do not resist the destructive actiou of auy tests so well as the former; and in the present case, viz. when treated the permanganate of potash, they are very little or not at all superior to prints obtained upon plain chloride paper by direct exposure to light. Therefore, judging from this test, it is not the mere fact of development with gallic acid that gives superior permanancy, but rather that continuance of the development which produces an additional deposit upon the image.

Positives developed upou a surface of *chloride* of silver on plain paper have not, in my experiments, resisted the oxidizing action so perfectly as those on iodine and bromide of silver.

Prints developed upon paper prepared with serum of milk are superior to those on chloride of silver, and equal to positives developed upon iodine of silver. I explain this by a peculiar action of the caseine remaining in the serum, as will presently be more fully shown.

Of priuts obtained by the ordinary process of direct exposure to light, those on plain paper are the first to fade, the oxidizing action being most seen upon the *half-tones*. Positives printed on ammonio-nitrate paper prepared without previous saltiug fade out very perfectly, from not possessing much vigour in the deep shadows; but in this case no doubt the degree of intensity of the negative, by influencing the *bronzing* of the dark parts, would greatly affect the result.

The mauner of *toning* the print is a point of importance. Previous sulphuration iu an old hyposulphite bath facilitates the oxidizing action, whilst toning by gold retards it. An examination of the mounted specimens will show that the protecting influence of the deposit of gold is principally seen upon the *full shadows* of the print, the lighter shades not being so perfectly preserved.

A convenient illustration of the difference in the action of oxidizing agents upou prints toned respectively by sulphur and gold is shown by immersing them in a dilute solution of chromic acid. The former are quickly reduced to the condition of blank paper, whilst the latter are comparitively unaffected. If any one should wish to repeat this experiment, or to use chromic acid as a test for the presence of gold in a print, a convenint mode of preparing the solution is as follows:—

Bichromate of potash	6 grains.
Strong sulphuric acid	4 minims.
Water	12 ounces

One point still remains to be mentioned, which I trust may prove important,—it is the remarkable advantage gained by using *albuminized* paper, as far as the actiou of an oxidizing solution is concerned. The specimens will show that the albuminized prints submitted to oxidation are more perfect in the halftoues thau any others. Developed prints on albumen staud far better than the same upon plain paper; and even the albuminized "sun prints" are less injured by the permanganate thau the best of the negative prints prepared without albumen. It may appear that the action of the albumen is altogether mechanical; but this does not seem to be the case, since in treating paper positives with dilute solution of sulphuretted hydrogen, in order to fade them by excesive sulphuratiou, the same protective effect is not noticeable; the albumiuized proofs suffering almost as much as those ou plaiu paper.

On first observing the comparative perminence of the albuminized paper proofs, it occured to me that perhaps *caseine* employed as a superficial coating to the paper might produce the same effect; since it forms with nitrate of silver, an insoluble compound resembling the aluminate of oxide of silver, and darkening to a brick red powder on exposure to light.

To determiue this, a solution of caseiue was prepared, free, or nearly so, from the other constituent of milk, and chloride of ammouium added to it in the usual proportion. Paper floated on this liquid, and subsequently rendered sensative with nitrate of silver, darkened in the sun to a full purple tint, which changed to a lighter red in the fixing bath. The positives were free from gloss, and resembled in appearance those obtained by the use of serum of milk, which, as far as I have observed, still contains uncoagulated caseine after treatment with washed rennet.‡

* Hydrochloric acid, which is usually recommended in place of acetic acid, cannot be employed in this experiment; it seems to cause a liberation of free chlorine, which bleaches the print instantly.

† Even in the alkaline solution of peroxide of hydrogen, a narrow line of bleaching action was visable at the surface where the air and liquid were in contact.

‡ Sixteen fluid ounces of serum of milk, prepared by coagulating milk with washed rennet, and subsequently boiling and filtering, yielded, on

The result of the action of the permanganate of potash upon the caseine prints showed that they resisted oxidation somewhat better than positives upon plain paper, but less perfectly than developed prints, or prints upon albuminized paper. By rendering the caseine paper sensitive upon aceto-nitrate of silver and developing with gallic acid, positives were obtained exactly resembling those prepared by Sutton's negative process, and more permanent in the permanganate solution than positives developed upon chloride of silver on plain paper.

In conclusion, I may observe, that upon one of the cards will be found a positive on plain paper which was strongly waxed with a solution of white wax in ether before being submitted to the oxidizing action; it has suffered less than a corresponding print unwaxed, but more than a developed print upon albuminized paper.

Mr. Shadbolt:—With reference to Mr. Hardwich's communication, there seems to be some slight impression abroad that paper prepared by albumen must necessarily be better than what is commonly called plain paper. Now, it strikes me that the albumen resists the oxidating action, principally because it forms an insoluble compound with the nitrate of silver, so that the moisture is unable to penetrate it. It does not seem to resist the action of sulphurization any better than, if as well as, the common paper.

Mr. Hardwich:—I am not aware that there is any impression that albumen paper is superior to the other. The albumen papers did absorb moisture, whereas the wax paper did not, and yet the paper with the wax faded away more quickly.

From the Jour. of the Phot. Soc.

THE ALBUMEN PROCESS.

To the Editor of the Photographic Journal:

Sir,—As a subscriber to your Journal from the beginning and having a somewhat photographic turn of mind, I should be much obliged to you if you would allow me to describe as briefly as possible my mode of conducting the albumen process on glass. It is very simple, and somewhat different to Mr. Mayall's and Mr. Negretti's in manipulation, though similar in its results.

I should recommend to all young albuminists (beginners) not to try their hand at camera practice till they can make a very tolerable copy of any of M. Ferrier's transparencies,—if they aim high, of his recent Swiss views, but which latter, from the extreme delicacy of tone, are more difficult than architectural subjects.

My reason for this is, that by this means a negative can be expeditiously taken in half a minute, instead of the camera work of half an hour; and besides, it will teach the student the exact *look* that his camera negatives should posess in order to yield a good impression.

My process is the following:—

I take three eggs, and carefully separating the yelk and germ in the shell pour the white into a measure, which will give about eighteen drachms of albumen. Now add to this fifteen drops of weak acetic acid (not glacial), and stiring it with a glass rod, leave it alone for *one hour.*

Now put into a clean funnel a fine piece of cambric, and pass through it a little distilled water to moisten it.

Place in the cone of this filter twenty grains of *white* (not yellow or spoilt) *iodide* of ammonium, and on the top of it pour your now semi-coagulated albumen. It passes rapidly through into the clean pouring vessel below, dissolving on its passage all the iodine in the filter.

What results from this preparation should be *perfectly limpid,* and smell strongly of ammonia; if not limpid, *it should be refiltered* till it is so, as *germ* on the plate is still worse than *dust.*

This has been shortly given by Laborde in a former Number of your Journal, but I thought it best to be accurate.

Plates prepared with this fluid dry in two hours in a French box, and very quickly in any level one. The other advantages possessed by this albumen are, the production of very beautiful positives, for which purpose two grains of salt should be added to the iodide of ammonium; greater clearness in the lights of the proof and a finer definition in the camera, owing to the finer surface deposited on the plate. Indeed so fine is it sometimes, especially if quite free from germ, as to render the determination which side of the glass has been acted upon, by mere inspection, a matter of great difficulty; and it is for this reason that I prefer not using a holder, but keeping one corner of the plate, which I hold by, uncovered. The albumen side may then readily be ascertained by scratching, even in the dark.

The rest of the manipulation is so similar to Mr. Negretti's as to require no description, except that I always prefer camphor in the gallic acid, as I feel sure it keeps the lights clear.

In conclusion I would say, that I think no process in photography is so little subject to variation as the albumen, and for out-door work none can equal it; for after all, look at paper by the side of it—it cannot be compared as to definition, and surely that is the chief point in taking a landscape.

Again, if the iodide of ammonium be fresh, no paper halftones (beautiful as they are) can come near it; and in fact the only objection to it on a journey is the weight of glass which is indispensable, and I trust this may be overcome.

I should like to ask two questions of Mr. Mayall on the subject of albumen:—First, has it ever happened to him to have had his layer of albumen blister when washed after silvering, even after a long application of the drying box? If so, what is the reason? Second, what is the exact mode of obtaining Ferrier's beautiful brown, chocolate tones in his process?—salt gives black, not brown tones.

I have copied, I suppose, upwards of fifty of the best views, and when laid side by side they can scarcely be distinguished except in tone, as mine are always greenish black, even when fixed with a bromide. I enclose my card, and

I remain, Sir

Your most obedient servant,

N. I.

From Notes & Queries.

PHOTOGRAPHIC FAC-SIMILES OF OLD DOCUMENTS.

Mr. Lyte's late Letter to *The Times* on some difficulties in the application of photography to the production of fac-similes of MSS., was a heavy blow and great discouragement to the practice of the Art, in a department to which we believe it to be eminently adapted. We have great pleasure, therefore, in reproducing in our columns Mr. Delamotte's Letter to the same journal on this important subject; and we hope that able and practised photographer will complete the good work he has thus comenced, by communicating some practical suggestions as to the best mode of making photographic copies of early documents and printed books:—

"TO THE EDITOR OF THE TIMES."

"Sir,—In your journal of the 6th ult., there appeared a letter from Mr. Maxwell Lyte on photographic fac-similes of old documents, which is calculated to discourage attempts in one of the most valuable applications of the photographic art; but, as the statements contained in this letter are at variance with the experience of most photographers, I think, for the credit of the art, they ought not to pass uncontradicted.

"First, Mr. Lyte finds the grand obstacle to obtaining these fac-similes to be, "that the size of old paper becomes yellow by age, whereas the ink becomes light." Now, in photography it is necessary to be very precise when speaking of colors; thus, by yellow is understood the yellow of the spectrum, of which gamboge may be taken as the representative. Surely, Mr. Lyte will hardly venture to assert that old documents ever assume that color, or even any tone of it. By the agencies of smoke

the addition of nitrate of silver, a flocculent white precipitate, which weighed, when dry, 75 grains; it proved to be a mixture of chloride of silver with the compound of caseine and oxide of silver.

and damp, old documents frequently become brown, acquiring various tones of amber or sepia, from which the ink differs but very little in color or tone; but yet this differeuce, slight as it is, is generally sufficient to insure a good photographic copy. Experience and tact are, it is true, important elements in success, and probably all first attempts will be failures. Yet, as is well known to most practitioners of art, wherever any difference exists between the color of the paper and the iuk, that difference will be repeated in the photographic copy.

"Mr. Lyte considers these browus of old documeuts, theoretically, as if they were yellow and black, and hastily concludes that, as these latter have the same actiuic action, *ergo* the browns, which he regards as yellows, must produce the same photographic results, which, as is well known, is not the case.

"Mr. Lyte's want of success must, I fear, be ascribed to this perverse theory; if not, to his want of perseverance in mastering the difficulties that attend the practice of this branch of photographic art.

"The portfolios of most amateurs generally contain specimens of fac-similes of old documents; proving that the difficulty of obtaiuing them is not so great as Mr. Lyte's letter would lead us to suppose. I enclose one copied from a MS. in the Royal Irish Academy, takeu in the summer of 1852, during the Dublin Exhibition, which probably presented as many difficnlties as are usually met with in documents of this kind; and yet no great effort is required to make out every letter remaining in the manuscript. Photography does uot pretend to restore what is effaced or illegible in the original, but there are few things it cannot furnish a faithful copy of. I have learnt recently that it is contemplated to make a catalogue of the MS. in the Bibliotheque Imperiale at Paris, by taking photographic copies of the title-pages, &c.; if the obstacles to taking photographic fac-similes were as great as Mr. Lyte represents, such a task would scarcely be undertaken.

"It is too much the practice of photographers to proclaim the abortive results of their individual attempts as impossibilities of the art they cultivate; whereas they ought to consider that the same experiment which in the hands of one person is a failure, is often a brilliant success in those of another.

"As no oue among your numerons readers has thought it worth while to reply to Mr. Lyte's letter, I have taken upon myself to do so; for, as an old practioner in the art, I feel its character of universality in application should not be inconsiderately impugned. Photographic fac-similes of old documents are, I feel assured, not easily over-valued. Let no photographer be discouraged from attempting to produce them.

Philip H. Delamotte.

From the Jour. of the Phot. Soc.

MODIFICATION OF THE DAGUERREOTYPE.

To the Editor of the Photographic Journal:

Sir,—I practice the collodion process, and I admire its beauties; but I see no reason why the daguerreotype should be abandoned before its capabilities have been fairly tested. I am surprised that some of your correspoudents have not occasionally indulged us with a stray article or suggestion; and I venture to say, that if half the talent that is brought to bear upon other branches of photography were devoted to this, it would occupy a much more distinguished position than it now does. As matters now stand, a daguerreotypist labors under many disadvantages. The English plate (Soho) is absurdly dear; the Freuch plates have a large amount of alloy; and the electroplates which are uow in the market are not to be compared with what is called the bright plating. The plates with a decrease in price have decliued in purity, and the pictures have been consequently wanting in depth. I would suggest a cheaper kind of plate or tablet to carry the silver. If metal be used, why not use iron, or planished tinned iron, iustead of copper; and would not one-hundredth part of the silver now used suffice? But it is not necessary to use metal at all: glass or gutta percha would do as well. I would direct attention to Drayton's process for silvering glass. Take a piece of glass, place around it a wall of wax, cover it with amonio-nitrate of silver, precipitate with oil of cinnamon aud oil of cloves in equal proportion, or with grape-sugar. The silver next the surface will be very bright. If this conld be taken off, it would be a daguerreotype plate at once ready polished. Or coat the glass with varnish, aud black-lead it, and upon this deposit a coating of silver. Or dissolve gutta percha, as described by Mr. Reade iu the last Number of your Jonrnal, iodize it, pour it upon the glass, immerse the glass so coated in a bath of nitrate of silver, expose it to light, pour on a developer; metallic silver will be reduced; thickeu this by the battery process, rinse with distilled water, slightly polish, coat it, and take a picture. Gild or tone it by immersion in a warm bath of sel d'or or cyanide of gold; coat it with varnish, aud strip it off the glass. You would then have a daguerreotype picture as flexible as paper, which might be used to illustrate a book, or mounted to adorn a room. Auy material that will take a coating of silver may be used as a daguerreotype plate. I trust that the Photographic Society will give some attention to this matter; and I hope ere long to buy daguerreotype paper or cloth by the foot that will require no cleaning, and to be used only once.

I know of no objections to the daguerreotype picture except its cost, aud the metalic reflection; both of these difficulties, I think, may be overcome. If a picture be left in a bath of hyposulphite of soda for a day or two, the metalic reflection will almost disappear. I have seen a picture developed with pyrogallic acid. Would not a process of this kind get rid of metallic reflection?

It appears to me that the daguerreotype process has been too much limited. I should like to see it engraved; if it cauuot be engraved by a chemical prosess, it might assist the engaver; suppose a plate of thick copper ready for eugraving were immersed in the ordinary plating solution, it would receive a sufficient coating to obtain a picture which would be reversed, and might be taken to the exact size required. Gild it by the battery process, and draw it in with etching needles; make it the dissolving plate in a depositing vessel, and it would be engraved; the thin coating of silver would in no way affect the eugraving. Successful copies of daguerreotypes might be made by the electrotype process, if a non-adherent deposit could be obtained. In all those which I have seeu, the film of gold has come off with the copy, and the picture has been partly spoiled. Designs might also be put upon blotting-cases, tea-trays, work-tables, and cabinets, of surpassing beauty; and, if varnished, quite as durable as the painted designs.

Yours respectfully,

Edward Monson.

From Notes & Queries.

ON A NEW METHOD OF PRESERVING COLLODION PLATES SENSITIVE.

BY CHARLES A. LONG.

The important position uow occupied by the photographic art, and the iufluence it seems likely to exercise ou the progress of scieuce generally, leads me to hope that the process I am about to describe may be deemed worthy a passing notice in your valuable Journal.

The collodion process, generally, is too well known to need any detailed description, and I purpose therefore to confiue my remarks exclusively to the improvement in the process, having reference to the capability of the collodion film—after having been rendered sensitive—to preserve its sensitiveness for au indefinite period; so that the operator may be enabled to prepare any number of plates in his laboratory, and, as occasion offers, or favourable opportunities occur, he may expose his prepared plates to the actiou of the light in the camera, and develop the image impressed upon them at his leisure on his returu from the scene of operatious.

In order to render this description more clear, and the point at which the improvement or novelty commences more clearly defined, it may be as well to lay down the principal features of the collodion process.

The iodized collodion is poured upon a plate of perfectly clean glass, the superfluous quantity being returned to the bottle; the plate thus collodionized is immersed in a bath of nitrate of silver, the action of which is to convert the iodide in the collodion into iodide of silver, or, more properly speaking, into the sub-iodide of that metal. The film of iodide, thus formed, is extremely sensitive to light; and on exposure under proper circumstances, receives an impress from that influence, which has the effect of commencing a decomposition which is carried on to the required point by the developing agent employed—usually pyrogallic acid. The image is then fixed by the removal of any remaining sensitive substance, and a negative proof is the result.

In the process above described, it is necessary to use the plate, or rather to expose it in the camera, and develop the latent image before the film *becomes dry*; thus placing an insuperable barrier to the use of the collodion process for taking views, &c., at a distance from the spot where the plate is prepared. We are aware that various means have been proposed to obviate this inconvenience, such as tents, cameras with apparatus inside, &c.; all more or less inconvenient to the travelling photographer. It, therefore, is a matter of great and paramount importance, that we should be enabled to keep the collodion film sensitive for some considerable time; and this I propose to accomplish in the manner following:—The plate is to be coated in the usual manner with iodized collodion, and rendered sensitive in the ordinary way in the nitrate of silver bath. The time of immersion I have found to answer best, is from three to four minutes, at a temperature of 60° Fahr. On removal of the plate from the bath, it is to be allowed to drain from one corner for the space of half a minute, and the surface is then to be *very quickly* washed with *distilled water*. This is in order to remove the film of nitrate of silver on the face of the plate, which would otherwise interfere with the subsequent process. The plate thus washed, is to be placed in a horizontal position on a table, or levelling stand, and allowed to remain in that condition until the collodion film is just *surface dry*.

During the interval of the drying, prepare the following solution:—Dissolve 40 grains of gutta percha, as pure as it can be obtained, in one ounce of pure chloroform, place the bottle in hot water, and when the gutta percha is dissolved, allow it to settle, and decant the clear liquid into a perfectly dry bottle.

The plate being by this time *surface dry*, hold it in the same position as when pouring on the collodion, and spread over its surface as quickly as possible the clear solution of gutta percha, returning the superfluous quantity to the bottle. When the plate has tolerably well drained, turn it into a horizontal position once more, and after waiting a few minutes (the exact time depending on the temperature), it will be found coated with a transparent tough skin of gutta percha.

When quite set, which may be tested by the touch, pour some of the solution of gutta percha into a shallow porcelain or glass dish longer than the plate, and then dip the edges of the plate successively into this to the depth of one-eighth of an inch, keeping the plate in a vertical position all the time; by this means we thoroughly envelop the sensitive film in a case of gutta percha, thereby *preventing the escape of the moisture*, contained in the collodion film, for *an indefinite period.*

Having prepared our plate thus far, it can be stowed away in a dark box to await the exposure in the camera.

It will be obvious to most persons that the plate prepared as above requires a little different treatment in the camera, the only difference, however, being in the position assigned to the sensitive surface, which in this case is that next to the glass on which the film is spread; the glass side of the prepared plate is turned towards the light, and after being exposed to the influence of the actinic radiations for the requisite time, it is removed, and subjected to the following operation, in order to develope the latent image.

By means of a sharp penknife cut through the film of gutta percha on the coated side of the glass, all around the edges, and having previously wetted a square piece of white blotting-paper, place it in contact with the film, using a gentle pressure to make it adhere, in such a manner, that one edge of the blotting-paper may come within one-sixteenth of an inch of the top of the film; with great care this unoccupied one-sixteenth of film is to be turned over the edge of the blotting-paper, and there held by the thumb of each hand, one on either corner; then, by cautiously lifting the corner under each thumb with the nail of the forefinger, at the same time withdrawing the hands in the direction of the bottom of the plate, we can easily strip off the whole of the film and have the surface exposed on which the light has been allowed to act.

The blotting-paper, with its adhering film upwards, is then to be placed on a porcelain slab, which has been previously wetted with distilled water, and the developing solution composed of pyrogallic acid $1\frac{1}{2}$ grains, acetic acid $\frac{1}{2}$ drachm, water 1 oz, is to be poured over it, and manipulated in the same manner as if we were operating with the ordinary collodion film.

When the picture is sufficiently developed, remove it, still on the blotting-paper, to a bath of hyposulphite of soda of the usual strength, and finally free from the blotting-paper, to a capacious pan of clean water, where it may be allowed to soak for some time, in order to free it from any adhering hyposulphite.

The picture thus produced is placed between folds of blotting-paper, and dried spontaneously; when dry it can be printed from in the same manner as any other negative.

The advantages attending this new process are obvious, for by the envelope of gutta percha we entirely prevent the evaporation of the moisture requisite for the sensitiveness of the film, and are thereby enabled to keep the plate for an indefinite period,

Further, there is a vast advantage over other plans which have been devised for the same purpose, namely, that the film destined to receive the image is *perfectly protected from dust*, one of the greatest enemies of the photographer.

Again, the proofs when finished are more easily stowed away, and are not so readily damaged as when left on the glass: in fact, when more practice has been bestowed on the process than I have yet been enabled to give, I have no doubt that it will be as easy to prepare plates of very large dimensions, as it is at present those of small size, and that the photographer will be in possession of a means of perpetuating scenes which at present, owing to the difficulties in out-door manipulation, are quite beyond his reach.

PLAIN AND SIMPLE RULES TO BE OBSERVED TO PROCURE COLLODION POSITIVES.

To the Editor of the Journal of the Phot. Soc:

Sir,—I have been a subscriber to your Journal some time, and have been much pleased, and often much disappointed at many articles I have read. I have practised as an amateur about eighteen months; have conversed and read a great deal, and almost invariably found a great amount of secrecy and nonsense prevail amongst those who have a little more knowledge than their neighbours, and especially those who fit cameras together and vend them in provincial towns, and who promise so much when you are purchasing your various articles. I have met with many disappointments, but at last have arrived at tolerably good success,—I wish I could say with your correspondent, "Universal Success." I will, if you will allow me, Mr. Editor, endeavour to contribute to those who are commencing the study of collodion positives, my mite toward their success. It is better that each operator should prepare, as far as practicable, his own articles used in the process; commencing with *gun-cotton*, which is very easily made in the following manner: Immerse carded cotton in equal parts of sulphuric and nitric acid, with a glass rod or pipe, for three or four minutes, well wash in plenty of cold water, and gradually dry. Or, nitrate of potass, dry, $\frac{1}{2}$ oz. in powder, sulphuric acid 6 drachms, sp. gr. 1·850; mix in

a glass basin, then quickly stir into it 30 grains of cotton with a glass rod for three minutes, then wash as above. Then add 3 or 4 grains of the dried cotton to the following: ether 5 drachms; alcohol 3 drachms; let it stand a short time, and decant off, then you have *collodion*, which you may iodize in the following manner, either by adding 3 or 4 grains of iodide of potassium, or 30 drops of a supersaturated solution of iodide of potassium and silver in spirit of wine, and 20 drops of a supersaturated solution of bromide of potassium to 1 oz. of collodion. Always thin your collodion with ether. Chloroform is sometimes added to collodion, to make it more tenacious, in case it becomes rotten and easily washes off the glasses.

The *Nitrate Bath* is made of 35 grains of nitrate of silver in crystal to 1 oz. of distilled water. To be kept in a bottle coated over with black varnish.

Developing Agent.—Take of sulphate of iron 10 grains, glacial acetic acid 20 minims, diluted nitric acid 5 minims, soft water 1 oz.; *or* sulphate of iron 1 drachm and 2 scruples, acetic acid 1 drachm, nitric acid 10 drops, soft water half a pint; *or* sulphate of iron 30 grains to one oz. of water. I always add half an oz. of spirit of wine to half a pint of the above solutions.

Fixing Solution.—Cyanide potassium 5 grains to one scruple to the ounce of water. The above solutions should be carefully filtered through paper, having a funnel for each. It is better to use the paper for the nitrate of silver as long as it will last; the paper to some degree decomposes the silver. Be very careful to have your object in proper focus, and your glasses very clean; wood-naphtha is best for this purpose. Wash well in a plentiful supply of water, after pouring on your developing solution, which you must do only in sufficient quantity to cover your plate. Use a pitcher with a small spout, or a glass measure, pouring it on at the heel of the picture. It is better to develope a large plate by immersing in a bath kept for that purpose. See that the necks of all your bottles are very clean whilst operating to prevent spots on your pictures. Let your picture, after well washing in a plentiful supply of soft water, dry spontaneously, then use your transparent varnish. The varnish I use is that of Alexis Gaudin, 9 Rue de la Perle, Paris; and, lastly, the black, which you may make by dissolving asphaltum in coal-tar naptha.

N. B. Be careful to procure the best chemicals, and do not ask for spirit of wine when you want absolute alchohol.

If there be water in your alcohol or ether, you may at once detect it by allowing a drop to fall into spirit of turpentine, with which they ought to mix without turbidity.

Should, Mr. Editor, the foregoing remarks meet with your approval, you will by inserting them in your next oblige one who will at all times be ready to assist you in the mysteries of the photographic art.

Yours respectfully,

Ars longa, Vita brevis.

From the Jour. of the Phot. Soc.

ON THE HONEY PROCESS.

To the Editor of the Photographic Journal:

Sir,—I have been asked to send you an account of the following honey process, as it may be interesting to photographers generally, and especially to amateurs. Its success and certainty have been completely proved during the past summer and autumn.

1. The collodion to be allowed to set or become firm on the plate from eight to ten seconds before being placed in the silver bath from four to five minutes. 2. The excited plate is then rested vertically on the bath, and the excess of nitrate of silver dripped into it for not less than sixty to seventy seconds. 3. The honey syrup floated twice over the plate, for one minute each time. 4. The plate placed vertically on blotting-paper, in a close dark place, to drain thoroughly, before being put into the dark box for carrying the plates. 5. The proper time for exposure to be discovered by experiment. 6. The plate immersed vertically in a bath of distilled water for not less than five minutes, and moved slowly up and down five or six times immediately before removal. 7. Drain the water off for a few seconds; develope and fix in the usual way.

Failures will of course occur in first experimenting upon any new method; but success which has been attained by adopting the preceeding plan should satisfy those who will persevere, that they will soon arrive at a sufficient and encouraging certainty. With the view of facilitating that end, the following explanations are added to general description, especially remembering the words of Mr. Llewelyn:—"I have descended into particulars which will, I fear, seem tediously minute to those who are not aware how much in photography, depends upon trifles. But I am convinced that the difference between the works of different operators mainly consists in the observance or the neglect of trifles seemingly altogether unimportant."

2. I have never used a washing-bath for removing the excess of nitrate of silver. The dripping of the excited plate from sixty to seventy seconds seems to effect a similar purpose. After these seconds have passed, the plate should be held up, and the honey not poured on until drops cease to fall from the lower corner. Ought not the effect of the plan of dripping off the excess of nitrate of silver be to leave the plate more sensitive than by using the washing-bath?

3 Use equal parts of honey and water; mix thoroughly by shaking in a bottle, and then filter. The filtering is slow, but when pressed for time, use different filters, and change the filtering-paper frequently. With that consistency of honey, plates have been used varying from one to nine days old, and no difference in the results was apparent. For almost all practical purposes, this is quite long enough for plates to keep. The honey should be filtered shortly before being used, though it may be kept for some days. But the syrup should be thrown away as soon as it has the slightest sour smell. New and old honey are equally efficient, but its purity must be undoubted. The only way to secure that is to ascertain that it has been carefully dripped from the comb without allowing any of the wax to have been melted. The palest and purest honey is to be preferred. The syrup should be poured on, while being moved along one side of the plate, in sufficient quantity so as to flow pretty quickly over the whole plate, and then it is waved gently, while taking care that all the surface is covered, until the one minute is passed. The second quantity of honey poured over is to be used for the first dose of the succeeding plate. Remove with a glass rod any bubbles formed on the honey being poured back into the measure.

4 In all the operations the plate must be preserved from any impurity. Dust must be carefully kept from the slides, dark box, and calico bag. The exposed plates are changed from the slide into the dark box, and the unexposed plates transferred from it in a double-fold yellow calico bag, which is thrown over the head and shoulders, and tied inside round the waist, so as to exclude any light,—bending on the knees, and resting the bag with the box and slides on the ground.

5. A few preliminary trials will alone prove the necessary exposure. That must depend upon the judgment of the operator, which will be swayed by different circumstances, such as the comparitive clearness of the daylight, the character of the scene, the color of the objects, the size of the diaphragm, the color of the honey, &c. The greatest difficulty is to get the shady parts of a scene sufficiently brought out, and the light parts not to be overdone; but generally a slight over-exposure seems not to be dangerous with the honey process. In the early part of one day I deemed the light required a certain exposure; and from a change to a cloudy sky in a few hours afterwards, the exposure was doubled; and both plates, prepared at the same time, produced equally good pictures.

6. Five minutes' immersion in the water-bath has been proved to be quite effectual for removing the film of honey; but if the plate has been kept above five days, the same number of minutes as of days may be given. I have never used plates above nine days old, and have then found the water-bath effectual for taking off the syrup. The same bath may be used for a number of plates, until it gets discolored or dirty. Filter the water occasionally through fine muslin. For those who wish to develope on a journey, it should be ascertained if rain-water, boiled or unboiled, would safely remove the honey. Steaming

the plates, when kept for a long period, may be required; but, to save time, I have never practised it on plates preserved up to nine days.

7. After removing the honey film, I used to dip the plate for a few seconds in the silver bath; but that has been altogether abandoned for fear of spoiling the bath. The following plan for developing is equally efficient:—Pour the pyrogallic solution over the plate, and allow it to remain for a few seconds, until the surface is thoroughly wet. Then return the solution into a measure, into which there has been poured as many drops of the silver bath as the size of the picture requires. Mix them well with a glass rod, pour the mixture over the plate, and wave it, until the picture gradually appears, and the necessary intensity is obtained. If the proper exposure has been given, that intensity is got by the first developing solution; but if not sufficiently intense, drain the plate a few seconds to remove any impurity, and pour on another solution of pyrogallic and silver, mixed at once, and the proper depth should be secured if the correct exposure has been approached. The developing solution is:—water, one ounce; pyrogallic acid three grains; glacial acetic acid, a half drachm,—reduced, by adding water, down to one grain of pyrogallic, according to the temperature of the weather. The pyrogallic is mixed with rain water.

For fixing, I have used a saturated solution of hyposulphite of soda.

The development has been generally made during the evening of the day on which the views were taken; but completely successful development has been made in various cases next day, twenty-one to twenty-three hours after exposure. Such a delay makes no difference in the result.

As to the certainty of this process, the experience of different operators here, shows that there should be few failures—say two out of every twenty plates. Such a result, however, implies, that every plate is rejected which does not show complete purity after the collodion is allowed to set for a little, and that the honey, collodion and silver, are all perfectly sound. The pure honey ought not to be blamed for errors, for mixing with the nitrate of silver, &c., if the other materials are faulty.

The following probability of success may be stated. On four different occasions, five, six seven and five plates* were taken to the country, prepared at different intervals before the journeys; and all were successful, except in two instances, arising from deficiency of exposure and light. No anxiety ought to induce exposure, when it is not clear that the prolonged time the honey process allows for exposing, will make up for the want of bright light. Pictures from a finely carved pulpit in a church, and from an *alto relievo* in a room were obtained on dullish November days by an exposure of almost three hours.

Those wishing to ascertain all the capabilities of of the honey process, ought to test the time which can with confidence be allowed to elapse between the exposure and development. If the latter can be safely delayed for a number of days after exposure, how admirable the advantage to the tourist! He would have only to carry his camera, and boxes with plates; and can anything less be carried for any process? He may traverse a romantic country, with a finer enjoyment of its beauties, and without depriving himself of the society of his friends, can bring away truthful pictures of its most attractive scenery.

The few experiments I have made on keeping plates after exposure, tend to show that the delay may be accompanied with success. Six plates were prepared, and not exposed until from 181 to 254 hours after the preparation. These were then developed, on successive days, from 61 to 123 hours after the time of exposure. Two of them were failures—one of them clearly traceable to exposure on a dull day. The others were not perfect, but intense, and pretty good negatives. Two of them were steamed for a short time after being in the water bath ten minutes—the bath in the longest-kept plate (which was developed successfully) being of rain-water unboiled—and this plate having been developed 377 hours after preparation. But even if it were necessary to develope from day to day during a tour, all that would be required to be carried would be a little pyrogallic acid, silver, acetic acid, and cyanide, and an indian-rubber bag for the bath, which could, when used, be expanded by a simple contrivance. Rain-water, boiled or unboiled, will answer for the mixtures.

The great desideratum is a plan which would insure good views to be taken on a journey, with tolerable certainty, and with as little labour as possible *when away from the conveniences* of the usual operating room. Let it be considered, when the efficiency of the honey process has been clearly proved, what other method is superior in economy, certainty, easiness of manipulation, simplicity, and sensibility? Until some discovery, better than Mr. Shadbolt's, and requiring less labour, is made attention should be given to perfect what he originated. One especial advantage of this simple honey process to amateurs is, that the indoor work can be done in the mornings and evenings, without interfering with business-hours; and the exposure of the plate only requires that which a prudent man ought to dedicate to exercise for the benefit of health.

I am, Sir, Your obedient servant,

JOHN STURROCK, Jun.

* Panmure House, Mains Castle, Glammiss Castle, St. Andrews.

From the Jour. of the Phot. Soc.

ON THE USE OF PAPER
As a Substitute for the use of the Dry Albumenized Collodion Plates, in M. Taupenot's Process.

To the Editor of the Photographic Journal:

Sir,—Reading the account of M. Humbert de Moland's experiments with iodized paste as a substitute for the collodion in the process of M. Taupenot, page 237 of your October Journal, it occurred to me that paper might be prepared which would produce the same results dry in the camera, as the dry albuminized collodion plates.

In my experiments I proceeded as follows:—Some salted sheets of Canson's positive paper (which I had prepared for other experiments) were first soaked in a solution of iodide of iron, and when blue, washed in water, and then soaked in a weak alcohol-and-water solution of nitrate of silver, saturated with iodide of silver (a collodion bath solution), and coated with iodized albumen. These, when dry, were coated with aceto-nitrate of silver, and again dried and exposed a few seconds to diffused light in a printing frame under a collodion negative, developed with a saturated solution of gallic acid, colored with sel d'or, and fixed with hyposulphite. This process gave me excellent results: 15 seconds' exposure by gas-light, and in fact, one with only two seconds' exposure, developed with proto-nitrate of iron, was sufficient time.

In repeating the experiments yesterday and again to-day with fresh paper prepared in the same manner, I am unable to obtain any satisfactory results, an exposure of fifteen minutes being insufficient to obtain a picture, and when developed the results are entirely different from those of the previous day's trial.

I have repeated the experiments with salted and unsalted paper, with aceto-nitrate, and ammonio-nitrate of silver, and with the bath solution, but without success.

Perhaps some of your readers can suggest the cause of failure, or rather the exceptional success of my first experiments.

J. A. M.

— IN the arts, alumina forms the basis of some of the most, beautiful colors, such as the Adrianople red, and the alkanet-root lilac. It forms the basis of the beautiful porcelain made in china, and of it is made the pyrometer, for measuring the hightest degrees of temperature in furnaces.

GREAT MEN, like comets, are eccentric in their courses, and are formed to do extensive good by modes unintelligible to vulgar minds. Hence, like those erratic orbs in the firmament, it is their fate to be miscomprehended by fools, and misrepresented by knaves; to be abused for all the good they actually do, and to be accused of ills with which they have nothing to do, neither in design or execution.

THE GREAT MASTERS OF ART.

No. VII.—JOHN JOUVENET.

It is not a little remarkable that France, with the encouragement which, through centuries past, has existed in that country for great works of sacred and legendary art, should yet have produced very few worthy of ranking in the highest class. Churches, chapels, monasteries, and religious houses of all kinds abound, or at least till the first great Revolution, did abound in the land, creating an almost universal demand for such works; and still no painter of extraordinary ability arose to answer the call. Francis I., the enlightened patron of literature and art, invited to his court such men as Leonardo da Vinci, Andrea del Sarto, Primaticcio, and others, not less with a view of securing their talents for his own individual purpose, than with the hope that their example might operate favourably upon any latent genius France possessed; but we do not read of any especial good result arising from the monarch's liberality. The first painter having any claims to meritorious notice was Simon Vouet, who flourished about the middle of the seventeenth century; yet his works scarcely reached a second-rate rank. He was followed by Le Brun, an artist of undoubted ability, but deficient in that sublimity of conception which can alone bring forth a grand work; by Eustice Le Sueur, who produced some fine pictures as regards composition, yet devoid of power from the absence of any vigorous and forcible colouring; and by Peter Mignard whose reputation belongs rather to Italy than France, though he passed two years of his early life in the school of Vouet. These are all the names, with the exception of Jouvenet, that have the least

THE MIRACULOUS DRAUGHT OF FISHES.

pretension to high rank, for we do not recognise N. Poussin in the French School, as he owed all his greatness to his Italian education, notwithstanding he had acquired some popularity ere he accompanied Marino, the poet, to Rome. To the modern school the remark with which we set out is equally applicable; neither David, nor Gerard, nor Le Gros, nor Girardet, have any pretension to be placed among the greatest masters who pratised sacred historical painting.

Till within the last five or six years considerable obscurity respecting the ancestry of John Jouvenet, a matter which in itself, is of small importance if, as is generally admitted, the virtues and vices of a man's progenitors are not his own. But, in the present instance, the establishment of the fact of Jouvenet's descent is not without interest as showing his origin from a numerous family of artists, which has been recently placed almost beyond dispute by the researches of M. Houel, an advocate of Rouen, in which city Jouvenet was born. About the middle of the sixteenth century a painter and sculptor, John Jouvenet, presumed to have migrated from Italy, settled in Rouen, where he died in 1616. He was the origin of several families of artists; one of his sons, it is said, instructed N. Poussin in his earlier years. This son, whose name was Noel, had himself three sons, each of whom was, in one way or another connected with art; one married the daughter of a sculptor named Rabon; another gave his daughter to William Leviel, a clever glass painter, and the third Laurence Jouvenet, a painter and sculptor, had five children, of whom Marie Madaline, married John Restout, an artist of Caen, father and grandfather of the Restouts, members of the Academy of Paris; another, Francis Jouvenet, was painter in ordinary to the French Court, and the third was John, whose portrait stands at the head of this brief notice. So many artists, directly or indirectly, springing from the same source, form a singular record,—so singular that no apology need be offered for dwelling upon it. These facts we learn from M. Charles Blanc, in the "Histoire des Pientres," to which work we are also indebted for other information contained in this memoir.

EXTREME UNCTION.

The date of Jouvenet's birth is April 1644: having studied for some time under his father, receiving also the instruction of his uncles, he was sent to Paris. Lebrun had already established the Academy of the Fine Arts, with the assistance of a body of artists who brought from Rome and Bologna some portion of that feeling for Art, and a certain amount of the style, which characterised these distinguished Italian schools. Jouvenet was then but seventeen years of age; Mignard and Lebrun were at the head of the French School, and the young artist became the pupil of the latter. So intuitive, however, was his talent, and so well had it been developed under his earlier instructors, that Lebrun immediately employed him to assist in painting the ceilings of the Palace at Versailles, which Louis XIV. had then but recently determined on converting from a comparatively insignificant château into a residence suited to a great monarch. For nearly ten years Jouvenet appears to have been so occupied, and this term may be regarded as the first period of his practice: during the time, however, he found opportunity for painting his "Winter," for the series of the "Four Seasons," at Marly; the ceilings of the hotel Saint-Pouanges, and the "Martyrdom of St. Ovide," now in the Museum of Grenoble. Until the termination of this period he had not been able to divest himself of those influences which seemed in a great measure to keep down, or, at least, to limit his natural genius; but, in 1672, a decided change was manifest in his style which became bolder and less mannered, so that in the following year he had attained such proficiency in the higher qualities of Art as to carry off the second great prize in the Academy, and in the same year his age being then only twenty-nine, he painted "The Paralytic Healed," for what was called the "May Picture." A picture so designated was, till the practice ceased in 1708, annually presented by the goldsmiths of Paris, on the first of May, to the

Virgin, in the cathedral of Notre Dame. The picture painted by Jouvenet established the artist's reputation—Vermeulen the eminent engraver asked permission to engrave his works, and Lebrun once more invited him to assist in the decorations of Versailles.

In 1675 he was admitted into the French Academy, of which he successively became professor, director, and perpetual president· the subject of his "reception" picture, as it is termed, was "Esther before Ahasuerus."

In 1683, the death of one or two relatives induced him to visit

THE DESCENT FROM THE CROSS.

his native city, Rouen, where he was received with much distinction, but the king speedily recalled him to Paris, and gave him apartments in what was then called the "Palace of the four Nations." The first work he assigned himself in his new atelier was one on a grand scale, twenty-eight feet long, by thirteen in height, the subject "Jesus Healing the Sick." This picture may be called a *resume* of the artist's talents as well as of his defects; his figures are vigorously grouped, full of spirit and movement, but they are not a little vulgarised in expression, and the shadows are not correctly indicated.

His next great works, painted in the five or six following years, were "Isaac blessing Jacob," for the Museum at Rouen;

"*Nunc Dimittis*," for a college of Jesuits; the "Family of Darius," and "Louis XIV. Touching for the King's Evil."

The death of Lebrun taking place in 1690, Jouvenet became the head of the French School, for Mignard, although still living, had reached the advanced age of eighty, and was consequently out of the field of action. "The Marriage of the Virgin," and a portrait of the abbot of St. Marthe, were painted about this time, as was in all probability the portrait of himself preserved in the Museum of Rouen. In 1693 he was compelled to seek change of air and to try the medicinal waters of Bourbon, in consequence of an attack of apoplexy. Having after some time regained his wonted health, he returned to his labours in 1696, and was summoned to Rennes to paint the ceiling of the Chamber of Parliament. During his stay in the city he painted, in forty-five days, three ceilings for the registrar-general, in whose house he lodged.

Louis XIV., desirous of bestowing on this painter some mark of his favour, bestowed on him a pension of twelve hundred livres, which sum, at a subsequent period, when the decorations of the palace at Versailles were completed, was increased by five hundred more; he also offered to send him to Italy at the public expense, but Jouveuet, partly from indifference to quit France, and partly from indisposition, paid little attention to the proposal, and remained quietly in his studio at Paris. French writers upon art congratulate their country upon having possessed a great artist who had never seen Italy; perhaps had he visited the far-famed galleries of the south, they would have had more abundant reason to be proud of their countryman.

One of the finest of Jouvenet's pictures is unquestionably "The Descent from the Cross," painted in 1697, for the Convent of the Capuchins, at Paris, but now in the Louvre. To those who know the pictures of this subject by Rembrandt and Reubens, it will at once occur, that if Jouvenet had never travelled out of France, he must have seen engravings or sketches of these works, for his own treatment of the subject seems to be largely borrowed from both: the upper group reminding us of the latter, and the Jewish-looking figure in the foreground of the former. Still, the picture which the French artist produced is a fine work, most vigorously composed, and showing some admirable drawing A brilliant effect is produced by the great breadth of light thrown over the work; but it is certainly too strong for the hour of the day—"now, when the *even* was come"—at which the event is said to have taken place, although the mid-day darkness had long since rolled away.

Another of his last works "The Raising of Lazarus," engraved by Duchange and others; in this picture the artist painted his own portrait and also those of his daughters, standing among the spectators, to the right, between two columns. The picture of "The Money-changers driven from the Temple," (it is singular that Jouvenet should have again, in both these works, selected subjects already illustrated by Rembrandt) was the first of that series which were painted by order of the king, the last being "The Miraculous Draught of Fishes," completed in 1702. The others were "The Descent from the Cross," "Christ in the House of Simon the Pharisee," and "The Raising of Lazarus;" they were worked in the tapestry of the Gobelins, by command of the same monarch. In order that the artist might the more truthfully represent the "Draught of Fishes," he travelled to Dieppe, to make such studies on the coast as he might adopt to his purpose.

It was in the early part of this century—the eighteenth—that Jouvenet executed, in conjunction with Coypel and Poërson, the colossal frescoes of the Apostles, painted in the dome of the Chapel of the Invalids, in Paris; these figures stand about fourteen feet in height, and are finely drawn.

In 1709, we find Jonvenet, though in his sixty-fifth year, working at Versailles with all the enthusiasm of a young man; but in four or five years from this date, he lost the entire use of his right side and arm, from an attack of paralysis. Such a calamity would have deterred a less energetic artist—one, too, not necessitated to work—from any further attempt to labour in his profession, and, for a short time, it had this effect upon Jouvenet; but his studio was filled with scholars, and he felt he must do what he could to advance their interests. Among these young men was a nephew to Restout, a favourite pupil, who was one day painting a head in a large picture; the venerable artist was by, and took up, with his stricken hand, a pencil, to put a touch or two into the work; but the hand refused to obey his will; the pencil was then shifted to the other, when to the surprise of the painter, he found he could use it with almost as much facility as he had been accustomed to use his right. From this time he constantly painted with his left, and among the pictures so produced are "The Death of St. Francis," the ceiling of one ef the chambers in the Parliament house at Rouen, and his last work, "The Visitation of the Virgin," in the Cathedral of Notre Dame. He died on the fifth of April, 1717.

Jouvenet was, undoubtedly, an artist of high genius; but to place him on the same level with the great Italian masters is unjust to them.

REMARKS ON THE FADING OF POSITIVE PROOFS.

(From Hardwich's "Photographic Chemistry," 2nd Edition.)

The fading of paper positives has long been a source of annoyance to photographers:—a gradual loss of brilliancy and a yellow tint is seen to commence at the margins and half-shadows of the print, and to extend by degrees over the whole surface.

This matter has of late become of such importance that the Council of the photographic Society decided a few months since upon appointing a Committee, of which the writer has the honor of being a member, to examine and report upon it.

The experiments required, in order to be decisive, must necessarily extend over a long period of time, and it will be many months before the results can be fully known. As the present work, however, would be incomplete without some remarks upon the subject, the author has ventured to condense into a short compass the notes of his own experience and of the information which he has been enabled to collect from other sources.

The proofs which fade most frequently are those which have been fixed and also *toned*. It is this part of the process, so necessary to the artistic effect, which increases the danger.

On making inquiry it is found that there is considerable discrepancy between the opinions of different operators on the subject of fading, some complaining of it much, whilst others are seldom troubled with it. This so far is hopeful, because it shows that the evil, at all events, is not irremediable.

If a positive picture, as taken from the frame, be immersed in a solution of old hyposulphite, that is, hyposulphite associated with a compound containing loosely combined sulphur—and when properly tinted, be removed and hung up to dry without any previous washing, it soon turns yellow and becomes altogether pale and faint. Some have thought that the change is caused by the black sulphuret of silver absorbing oxygen and being converted into *sulphate* of silver; but this cannot be, because a solution of an alkaline sulphuret, which blackens sulphate of silver, has no effect in restoring the original color of this yellow substance.

It appears more probable that the yellow fading is due to *an excess of sulphuration*, or of sulphuration and oxidation combined.

The action of sulphuretted hydrogen gas or an alkaline sulphuret upon darkened chloride of silver has been studied by more than one observer; it first *blackens* the brown tone and then changes it to a greenish-yellow. This indeed is the same effect as that produced by the ordinary sulphuretted hypo. toning bath, which always causes yellowness when too long continued.

If we then bear this fact in mind, that an excess of sulphur destroys the print, it will be easy to understand some of the more obvious causes of fading. They may be classed as follows:—

1. *Imperfect washing.*—This no doubt, is the most important of all, and the most frequent. If hyposulphite of soda, even in minute quantity, be allowed to remain in the print, it will cer-

tainly cause fading. In that case you have sulphur liberated by a slow process of spontaneous decomposition; and the sulphur acting alone, or in conjunction with oxygen, on the already sulphuretted print, turns it yellow.

The operator is therefore desired to pay careful attention to the directions given at page 212, on the manner of *washing* prints, and if still further security is desired, to finish by immersion in boiling water. This proceeding removes the size and other matter sparingly soluble in cold water; but it is often objected to as injuring the tint of the positive. If the operation of toning, however, has been conducted properly in a solution containing gold, and the whole of the hyposulphite of soda has been previously extracted, no fear need be entertained of using hot water; it lowers the tone a little, but the original color returns on drying.

An exception must be made to this statement in the case of some of the English papers. The writer has obtained very pure blacks upon Towgood's paper, sensitized with plain nitrate of silver, and toned by hyposulphite of gold and acid, but finds that they are changed to some shade of *brown* by boiling water.

In using *albuminized* paper, it is important to remember that it requires very great care in washing. From the horny nature of its surface coating it is more slowly fixed and toned, and also more slowly washed than plain paper. The solutions take longer to enter, but having once penetrated are more difficult to be removed. This may be the reason why, although the general opinion is in favour of albumen, as giving very permanent prints, the experience of some who have large opportunities of judging is opposed to it.

2. *The use of weak solutions of hyposulphite of soda as a cause of fading.*—Dilute toning and fixing baths are often preferred from their yielding very brilliant tints; but it can be shown that their employment is unscientific and wrong. Upon the surface of the print, as it comes from the frame, there is much free nitrate of silver, which, when immersed in the fixing bath, forms hyposulphite of silver, a spontaneously decomposing salt. This should be *dissolved immediately* by an excess of hyposulphite of soda, if it is to be rendered permanent. Therefore if a bath be prepared so dilute as to contain only one part of hypo. to about six or eight parts of water, the strength of the solution being insufficient, *a shade of brown* may be observed passing over the surface of the print on its first immersion, and a large deposit of sulphuret of silver soon forms as the result of this decomposition. On the other hand, with a strong hyposulphite bath there is little or no discoloration and the black deposit is absent.

Now the decomposition of hyposulphite of silver, although producing brilliant colours, as any one may see by mixing nitrate of silver and hyposulphite of soda in a test-tube, is not a source which can be safely depended upon for *permanency*; in fact these transition compounds, ranging between hyposulphite and sulphuret of silver, are unstable and soon decompose.

Another evil following the employment of dilute hyposulphite for *fixing* is that it constantly fails in accomplishing the end proposed. The first few prints perhaps are found to succeed well, but after a short time *measly spots* of a yellow colour begin to appear, which are *in* the paper rather than on the surface, and are best seen by holding it up to the light. This again is decomposed hyposulphite of silver. It must be borne in mind that each atom of nitrate of silver requires *three* atoms of hyposulphite of soda to form the *sweet and soluble double salt*, and if less than this be present, another compound is formed almost tasteless and insoluble. No washing in water will suffice to remove it. Even immersion in a new bath of hyposulphite of soda does not fix the print when once *the yellow stage of* decomposition of hyposulphite of silver has been established. This yellow salt is insoluble in hyposulphite of soda, and consequently remains in the paper.

The most scientific mode of printing is no doubt that in which the nitrate of silver is washed out of the proof immediately on its removal from the frame. This point being attended to, a picture is obtained with the lights *pure* and free from any salt of silver, which may be proved by subsequent immersion in hydrosulphate of ammonia, whereas in the ordinary process there must be decomposition more or less at every part of the surface, as shown by the rapid change of properties which the bath of new hyposulphite experiences. Therefore, without asserting that proofs immersed in the fixing solution with the nitrate upon them will *necessarily* fade, which could not be proved, and indeed is contrary to experience, it will always be more satisfactory to employ a toning bath of such activity, that the accelerating influence of free nitrate of silver can be dispensed with.

3. *Carelessness in mounting the proof as a cause of fading.*—All elements that are of an acid nature or liable to spontaneous decomposition should be avoided. Sour and mouldy paste is very objectionable, but even this is better than paste containing *Corrosive sublimate*, and sold as "Everlasting," but in this case greatly misnamed, since the bichloride of mercury is peculiarly destructive to the coloured surface.

4. *Light and moisture as cause of fading.*—The print should certainly be kept in a dry place, free from damp and mouldiness; on this all are agreed. The exact action of *light*, however, upon paper positives is not so well known, although it is generally considered that they retain their brilliancy more perfectly when exposure to bright light is avoided. This point is one to which the attention of the Printing Committee will be especially directed.

Toning without gold as a cause of fading.—It has been said that prints toned in hyposulphite of soda containing no gold invariably fade; but such a statement cannot be substantiated, since many are in the possession of photographs of that kind which have stood for years. The experience of the writer does not extend back more than eighteen months; but he finds that pictures fixed in the solutions described at pages 205 and 206, are not altered by keeping, if properly washed in the first instance. Still it is evident that the coloured surface of a merely sulphuretted print is one easily susceptible of injury, since the simple pressure of the warm hand (leaving behind probably a little *acid*) will often produce a yellow mark.

The employment of gold salts in photographic printing, by causing a deposit of metallic gold, increases the chance of permanency under favourable conditions. This may be proved by taking two prints, one toned and fixed in a bath prepared with iodine or perchloride of iron, and the other in a solution prepared with chloride of gold. After careful washing immerse them both in *very dilute* solution of hydrosulphate of ammonia, when a marked difference will be observed, the sulphuretted print rapidly becomes yellow, whilst the gold print first *darkens*, and fades only when the action is longer continued.

It is plain from this *preliminary darkening effect* of the hydrosulphate upon prints toned by gold, that they commonly contain *less* sulphur than the others; hence they are further removed from the *yellow* stage in which sulphur is present in excess*.

It must be borne in mind, however, when using a fixing and toning bath containing gold salts, that the solution by constant use will lose gold and acquire sulphuretted acid principles, and that the latter proofs will contain little or no metallic gold unless a fresh addition of chloride be occasionally made.

The process of M. Le Grey with chloride of gold used alone, and that of Mr Sutton with the hyposulphite of gold and hydrochloric acid, are both likely on theoretical grounds to give great permanency; and the author has found this idea fully borne out by the application of destructive tests. The toning

* A photograph in the possession of the author, by the change which it has gradually undergone, illustrates so well the progress of the yellow fading, as to leave no doubt whatever upon its real nature. This print was prepared as follows:—On its removal from the frame it was divided into two parts, one of which was *simply fixed* in new hyposulphite of soda, and the other fixed and toned in a bath prepared with iodine, to a fine red purple tint. The two halves were mounted together upon a card, and left for several months. The washing process having been conducted rapidly, and in consequence *imperfectly*, the tint soon began to change: the rich purple passed slowly into a dark brown, and then became slightly yellow in the shadows. The dull red tint of the simply fixed half, on the other hand, *improved*, and at the present time, when nearly a year has elapsed, has reached to an agreeable shade of brown: the tint, termed above a red purple, is evidently an early stage of sulphuration, and, by the continued action of sulphur, becomes still darker before changing to yellow.

This illustration shows the effect of imperfect washing, and also proves that hyposulphite of soda left in the print injures it *more* in proportion to the amount of sulphuration which it had previously undergone.

bath in both cases is *acid* to litmus paper, bnt the acidity is differeut to that generated by old hyposulphite of soda, and does no tend to produee yellowness of the proof.

M. Le Gray's process, requiring excessive *over-printing* is ineonvenient and almost impractieable, unless the modification propossed by Mr. Hennah be adopted.*

The proposed employment of negative printing processes with a view of obviating fading.—If the priut be simply developed by gallic acid, and afterwards fixed in solutiou of hyposulphite of soda newly made, it would then be in the condition of an ordinary calotype negative, which the experience of mauy years has shown to be permanent. But it is diffieult to obtain brilliancy of tone by this mode, and if the gold bath be used to darken the shadows, the ease is altered. A developed print, toned and fixed *may* be more indestructible than one obtained by the ordinary proeess, but we cannot assume that such would be the ease, sinee the exaet composition of darkened chloride of silver—whether the same or differeut from that of a silver salt redueed by gallic acid—is unknown.

A simple plan by which the permancy of a positive proof to ordinary influences way often be tested.—Lay the washed print, whilst still damp, upon a clean sheet of glass, and allow water to drip slowly upon it for twenty-four hours; if it retains its brillianey unimpared at the end of that time, it may be eonsidered permanent. A eonvenient plan is to fill a small basin with spring water, and to hang a pieee of stout *cotton* over the side; this aets as a siphon, and keeps up a constant dropping. The action of the air and water together will produce a yellowness, if the picture is not properly washed.

For the Photographic and Fine Art Journal.

ALBERT G. PARK.

BY N. G. BURGESS.

See Illustration.

Albert Gallatin Park, the subject of this sketch, was boru on the 10th of August, 1824, at Newark, New Jersey, the same day which was eelebrated in New York as the landing of General Lafayette at Castle Garden.

In writing the life of an iudividual who has figured conspicuously in the Daguerrean Art, it would, perhaps, be unnecessary to enter into all the details of his early life.

His youthful days were spent, like most boys, at the common school, and uothing transpired to mark his eareer until he attained the age of fourteen or fifteeu, when his father started him out in the world alone to seek his fortune and a name among men. His first adventure was a trip to Mobile, whither he went eutirely alone unaceompanied by either parents or friends. He felt himself competent to travel that entire distanee alone, especially as his father desired him to go there to attend to some business connected with his mercantile transactions, His father at that time was carrying ou an extensive business in that southern city. Thither he weut alone and conducted his father's affairs in his absence as well as any young man of twenty-five. So well satisfied was his father that he continued him there during the next summer and he gave entire satisfactiou to his customers and his parental employer.

Business became at length unprofitable in Mobile, and partly from curiosity and the want of something to employ his mind, the yonng Park essayed the task of mastering the Daguerrean Art. His first lessons were received from our old friend, Barnes, of Mobile, who was then, in 1844 or '45, just opening his rooms in that city, and who has since then become so sueeessful.

Park soon evinced more than common skill and bid fair to become proficient in the art at that early day. He soon beeame the proprietor of a full set of apparatus, and eommenced his travels in Alabama, after which he visited his native place, Newark, and was engaged for a length of time in successfully practieing the art there. The next season he visited the South, and, finally, opened rooms at the Capitol of the State, Moutgomery, where he first became eminent and popular in this peculiar line of business.

Like many other Daguerrians who have conducted a successfnl business, he was free to spend his profits amongst his friends, of whieh he had a goodly uumber in Montgomery. He found, at length, that sphere too prescribed for him, and he left for the eity of Charleston, and was immediately employed by his friend, Mr. Geo. S. Cook, who had assisted him in former years. From thenee he eame on to New York and was in the employ of Mr. Brady, at his extensive gallery, corner of Fulton street and Broadway, where he evinced great skill iu the Daguerrean Art, and was then acknowledged equal to the oldest operators. He remained with Mr. Brady for one year, until he removed to his present location, where may now be seen many specimens of his skill whieh adorn that gallery at the present day.

He then returned to Charleston and opened a gallery in eonneetion with his brother-in-law, which was soon however relinquished, and he returned to New York to learn the Photographie Art, which had just then begun to eommand the attention of the Daguerrians of the United States. He was desirous to beeome as successful in this branch of the Heliographic Art, and we find him receiving instructions of Mr. Rhen, of Philadelphia, who has been so eminently suecessful in the Photographic proeess.

It is in this peculiar branch of Heliography that Mr. Park devotes his time and evinces sueh skill, especially, that of Photography known as the Ambrotype. He has made this an espeeial stndy and so perfected the art that he has prepared a new and useful set of chemicals, which are highly approved of by the profession.

His Ambrotypes are in a style so peculiar that they will command the admiration of all, and his Photographs are superior to many others.

A specimen of Mr. Park himself adorns this number of the Photograghic and Fine Art Journal, which was taken by him, and it is a beautiful and highly finished specimen of the Art. Beiug made on a white background, it presents peculiarities which are not seeu iu many portraits. The blending of the shadows are seen to be remarkably strong and the base of the baekground enveloped in clouds, presents at least a totally distinct feature from most other photographs. The perfect outlines so nearly resembling the finest engraving—without any retouehing—precisely as it came from the printing frame.

Mr. Park has exhibited many other specimens of his skill, all evincing good judgment iu position and chemical effeet.

At the present time he is engaged iu his favorite art with Messrs. F. H. Clark & Co. at Memphis, Tenn., where, we learn, he is remarkably successful.

We trust we may see him in onr midst again, ere long as his happy and smiling faee is always welcome amongst his old friends.

For the Photographic and Fine Art Journal.

GLUCOSE.

Marshall, *January* 27, 1856.

Mr. Snelling—Dear Sir—As it would appear that Glueose is likely to eome into use, I send you the following method of making the same.

Glucose is the name given to grape and starch sugar by M. Dumas.

Take to every gallon of boiling water 1 lb. of starch and $2\frac{1}{2}$ drachms of the strongest Sulphurie Acid, this mixture to be kept boiling over a sand bath for the space of 12 hours, the loss by evaporatiou to be supplied with boiling water ; after being thus boiled the acid liquid is to be carefully neutralized with chalk, filtered and then evaporated to the density of about 25° Beaumé, when it will be in a fit state to make the new developing agent of Mr. Maxwell Lyte. I also send you Mr.

* See Hennah's Collodion Process, third edition.

Wiggins' (of Ipswich, England) method of reducing silver from its solution.

It is simple, quick and cheap. The silver is first precipitated as a chloride. After well washing and breaking up it is put into a boiling solution of one part of hydrate of potass and two parts of water ; this is boiled for five minutes and whilst on the fire one part of simple syrup of the Ph. U. S. is gradually poured in with constant stirring. A violent effervescence takes place and black powder suspended in the potass solution immediately falls down as metallic silver. You then well wash the precipitate and dry it, after which it may be used for the manufacture of any silver salt. Yours truly,

J. J. B.

PHOTOGRAPHIC PATENTS.

To the Editor of the Photographic and Fine Art Journal:

Sir—The necessity and importance of a publication like your Journal to all who have any interest in matters connected with the various branches of the Daguerreotype or Photographic Art is evident to the most casual observer. Without undertaking to specify the great service which a popular, intelligent central organ may render to the profession, it is sufficient, for my present purpose, to instance the supervision it may and does justly exercise over the single matter of Patents.

In guarding the profession against impositions practised under color of law, your Journal has already accomplished much, and is rapidly acquiring a position that will enable it to exercise a more extensive influence in correcting a growing evil While appreciating the value of all legitimate inventions, and the obligations which the arts and the whole country is under to honest inventors, there cannot be too close a watch kept on those who make pretentions which they have no right to assume. There are a class of professed inventors in every department of mechanics and sciences, who by unfair means succeed in procuring patents for discoveries which they have never made, and by means of which they have imposed a tax on those who are induced to purchase their "patent rights." This has been practised to a great extent, and, so far as our own profession is concerned, just such an independent investigator as the *Photographic and Fine Art Journal*, is wanted to test the merits of all claims upon the attention and patronage of artists.

There have been quite a number of Patents granted by the Department at Washington, for alleged improvements in matters connected with our business. Some of these possess utility and have been, to a limited extent, introduced into the profession. Others are of questionable value.

Among the patents issued in 1854 were several in the mechanical department, for preparing plates, for cases, &c. viz :—one granted on the 31st January for plate holders to P. H. Benedict, one of the same date to H. T. Anthony for improvement in presses for making cases for pictures. On the same day a patent was granted to Thomas Longking for an apparatus for cleaning and buffing daguerreotype plates ; and February 7, to Reuben Knecht for improvement in daguerreotype plate holders. Still another patent for a similar purpose was granted on the 19th of September to Benj. F. Upton, and several patents for cameras, cases, &c. to other parties. Inventions or discoveries in the higher branches of the art are less frequent, but of all that have been issued up to the present period I may furnish such an account hereafter as will enable the readers of your Journal to form some estimate of their positive or probable value.

In the meantime, attention may be confined to the patents that have been secured for the production of the pictures now known as the "Photographic" and "Ambrotype." In reference to these there has been no little excitement throughout the country from the attempt that has been made to practice what has been looked upon as extortion in the sale of Patent Rights, and also from the serious doubts that have been awakened as to the validity of the pretended claim set forth by the pateutee himself.

What renders this question of patenting, a serious one, is the fact, that individuals have actually recorded claims in the secret archieves of the Patent Office to which they have no particle of right, which have, in fact, been actually translated, almost word for word from foreign publications. We have this moment before us a volume of "*Le Technologiste*," published at Paris in 1848, upon the pages of which appear the identical discovery for which a claim has been set up here and for which a patent has been actually secured from the Patent Office at Washington. These frauds—for they can be no less—are not only unjust to the Daguerreotypists of the whole country; but they are injurious to the whole Patent interests of the United States in creating unjust prejudices against honest *bona fide* Inventors and weakening that public confidence which is so essential to prosperity in every pursuit.

But the more immediate subject of our present investigation is the patent referred to in your own Journal, Mr. Editor, in July last, in reference to the Ambrotypes and Photographs, patented by Mr. Cutting. The claims set up by Mr. C. were of sufficient importance to invite the severe scrutiny to which you so ably led the way. Inasmuch as many artists in various parts of the country have been led to disregard those Ambrotype and Photographic Patents from the information furnished in the Journal, it is but just to the position you assumed, and the confidence which others have felt in its justice, that the facts of the case should be more fully stated as they are believed now to exist.

Mr. Cutting in addressing the publishers of the *Scientific American* contradicts an extract from a newspaper, published under the head of "Ambrotypes" and copied in the *Scientific American* April 7, 1855, and which purports to give a description of his method of producing pictures on glass ; with an attempt to identify his process with that previously used by Mr. Archer of London. He says the description contained in the extract does not give a correct account of his process, and is calculated to mislead the public with regard to the Patent which he holds. Mr. C. also says that in the list of patents published in the *Scientific American*, July 11, 1854, his claims were not correctly reported.

That no injustice may be done against any parties, take the following as the exact claims which Mr. Cutting *does* set forth as his, by right of discovery, and which are duly recorded upon the official records of the Patent Office. The following is the order in which the claims appear in the official documents, viz :

1. Patent, No. 11.213.—July 4, 1854.—For "improvement in the preparation of collodion for Photographic Pictures." "*Claim* the use of camphor in combination with iodized collodion." (Suggested or rather *tested*, I think, by Sir John Herschell, 1848, and rejected as worthless.)

2. Patent, 11.266.—July 11, 1854.—For "improvement in composition for making Photographic Pictures. This relates to photographic pictures obtained on a prepared film, upon the surface of glass or other transparent medium. The film employed is collodion ; to excite which, he says, take a deep one ounce vial, introduce $2\frac{1}{2}$ grains of bromide of potassium, add water drop by drop to make a saturated solution ; in this solution dissolve $2\frac{1}{2}$ grains of iodide of potassium, and add one ounce of collodion, which, after being spread on the glass plate, is immersed in a bath of 30 grains nitrate of silver, two grains iodide and one ounce of water. The negatives taken with the above are fixed and developed as usual. In this patent Mr. Cutting makes his *claim*—"The use of alcohol to deprive the cotton of water and the employment of BROMIDE of POTASSIUM in combination with collodion, &c. (*Bromine* was used by Fred. Scott Archer as stated in his "Manual of the Photographic Collodion Process," published March 1852, London.

3. Patent, No. 11.267.—July 11, 1854.—For "improvement in Photographic Pictures on Glass."

In the specifications, it is said "after a photographic picture has been fixed on glass in the usual way, another glass of the same size is prepared, and the two glasses are then connected together by a thin film of the BALSAM of FIR, which encloses the film of collodion, on which the picture is made between them,

thus insuring its preservation from atmospheric effects, improving its appearance, &c. In this patent the following is the extent of Mr. Cutting's claim, viz: "The combination of BALSAM with photographic pictures on glass, and with the additional glass, by which they with the balsam are hermetically sealed."

The foregoing comprises all the "claim," which Mr. Cutting sets forth, and all that he has secured in the Patents granted him. Their value is readily decided, and it is proper that the extent to which they interfere with the rights of others should be known and the intrinsic value of the patents themselves, ascertained for the information of all concerned.

The first patent, claiming the "use of camphor," is of little moment, few, if any, being disposed we believe to disturb the Patentee in the quiet enjoyment of that "right." Patent the 3d (No. 11.267) for the use of balsam (of fir) and the "additional glass" protects the patentee to the extent of the particular article claimed and no more. This claim is limited to the "balsam of fir;" any "equivalent" for that particular article not having been claimed, by the Patentee, but expressly omitted in his "claim" is, of course, thereby permitted to any one who may desire to "hermitically seal" two or more glasses. The recent decision on an application for an injunction in the Courts of Virginia, has, we believe, settled this point, and such unquestionably will be the result whenever the question may be judicially tested.

The second Patent of Mr. Cutting is still more liable to objection than either the first or third, from the fact that it has been improperly obtained, and is in reality of no legal value whatever.

Pending the application of Mr. Cutting, for the patent in question, and in order to remove an unfavorable impression as to his being the original discoverer, testimony was brought forward by the applicant for the purpose of showing that he had the *Bromide* bases with collodion in use as early as April 1853. This is the period which is fixed upon as the earliest at which Mr. C. pretends to have made his discovery. The certificate of Mr. Torsey of Chelsea, Mass., which reaches the remotest period claimed by Mr. C. says in substance, and literally, that "in the latter part of March 1853 or certainly before the 2d day of April 1853 he saw the applicant use a mixture of Bromide of Potassium with Collodion for photographic purposes, and with perfect success, &c.

Admitting this to be literally as stated, and allowing the insufficiency of the evidence of the successful use of bromide, either in England or in France, at an earlier period than that claimed by Mr. Cutting, we have other and positive testimony which settles the whole question and in a manner entirely conclusive, as to Mr. C.'s pretensions to originality or priority.

Mr. Cutting's discovery, it will be observed, does not pretend to have had an existence before March 1853. His application for a Patent is dated December 1853, and it was finally granted July 11, 1854.

Now this is all set aside and nullified by the fact that the discovery was actually made by Dr. C. M. Cresson of Philadelphia, and photographic pictures were made by him by COLLODION and BROMINE as early as May, 1852. The proof is upon record. The fact was published to the world first at a regular monthly meeting of the Franklin Institute, and, subsequently, to wit, in June 1852 in the Journal of the Franklin Institute. This valuable discovery was introduced to the notice of the Institute by Dr. Rand, who exhibited specimens to the members of pictures taken by the collodion process by Dr. Cresson, to which the attention of the meeting had been called at a previous monthly meeting. At that time it was stated that

"*By the addition of bromine the sensibility of the film had been much increased. The pictures exhibited were taken in from six to thirty-two seconds in diffused light, in one-quarter and one half seconds in the open air.*" JOURNAL OF THE FRANKLIN INSTITUTE, vol. 23 page 422. June 1852.

As there are some additional evidence bearing upon this subject, the introduction of which at this time would extend this article to a greater length than was intended, we leave the subject at present for future consideration, simply observing that the whole question of *patent monopoly*, is of too much importance to the profession generally to be slightly passed over.

M. A. ROOT.

FROM LOUISVILLE, Ky.

LOUISVILLE, *January 6th*, 1856.

FRIEND SNELLING—It is with reluctance that we take pen in hand to indite a few lines to your Journal from two causes, viz: 1st. We are so much confined with our business that we have nothing of interest to write upon beyond our own city, and, 2d. We are in the dark upon what subject your Dec. No. treats as we have not yet received it; why is it that you cannot make your arrangements so as to be more punctual with the publication of it? You must be well aware that in order to secure a trade of any kind, punctuality is one of the main features of success. We do not wish you to understand that we are writing in a fault-finding humor, but merely ask you the question, that you may give to us and your subscribers throughout the country the reason of the irregular issues of P. & F. A. J.

We are having a real New England winter here, with this exception, we have all the cold weather, but that clear, bright exhilerating cold is something we never see. The cold weather here is of that kind which chills the blood and numbs the limbs in such a manner that a person feels more like sitting by the fire, than stirring around. Everything is suffering from the effect of a continued cold spell; the river is full of floating ice (it being too high at this point to freeze over) and steamboats are obliged to lay up; of course commerce must suffer, and when that is the case we "small fry" suffer in proportion. There is one important branch of business men who are the gainers, and they are taking advantage of the time I can assure you, for they have not filled their "ice houses" with so fine a quality of ice in several years. We are satisfied to have this cold weather when we see such (to us) beautiful ice being hauled "in store" for the scorching days of next August. Oh! won't we have fine times drinking water with a good big piece of ice "into it" next summer? let it freeze, who cares.

What has become of the Club? Echo answers, what? We sent on 50 Photographs about a month ago, and we have not heard one word from them or any others since, and it is nearly time to send on the second lot, it will certainly "dry up" if there is not more punctuality in the exchanges. Your notice of the time for the first distribution was too short, less than two weeks; it was almost impossible to get up that number of pictures, in that length of time, without infringing upon the regular business; since that time we have adopted a plan by which we can get up the number without any inconvenience, and we will always be in time. Our plan is, when we sensitize paper, we prepare more than we want for our "sell work" and use the balance for the "Club Pictures," and the first thing we know when the time comes to send in the Club work, we have nothing to do but to finish them and send them off. Now, we do not claim any "patent" for the above plan, but *give* it out among the fraternity, that they may *improve* and *perfect* it.

There are none who would regret the failure of the "Exchange Club" more than we, and none will do more to prevent its failing. We had calculated upon receiving interesting pictures, and can hardly consent to believe that it "could die so young." We stand alone in this city in the production of Photographs, and we were particularly anxious to get work from other cities, that we could judge of our own success. How are we to know what our failures are without comparing our work with that made at other places. Everything receives its praise or condemnation by comparison; the old adage which says, "comparisons are odious" is proof of this fact. We will not deny, that this was one of the greatest inducements we had for sending in our names, and if, when the pictures are exchanged, we are thought worthy of remaining as one of the 50, we will agree after the ball is fairly started, to be on hand with the documents at the appointed time. Can anything be done to ensure the success of the "Club?" We know that you will do your

part; but, the question is, can you point out the trouble that we may all guard against such stumps in future.

We were in Cincinatti last week and found our friend, Faris, up to his ears in business, he is fitting up another gallery for Ambrotypes and Photographs, he only having the right for making the former *of the whole city*, by which means opposition in that line will be slim. Now the question arises, is the patent good? Some say it is, and some say it is not; some claim that it will prevent the making of Ambrotypes when only one glass is used in putting up, while others think that it can be evaded when two glasses are used, by not sealing with Balsam of Fir. There must be one grand trial of this question and the sooner it is tried the better. We will give a proportionate sum to defray the expense of defending a suit before the proper court believing that a decision either way would be advantageous to the fraternity at large. We take the opposite side to the Patentee, believing that there has been money enough made by him or them, to defray *their* expense, while we and a great number of others have made nothing, nor, in fact, do we expect to make anything by "selling rights," consequently, we are not so much interested in a decision as they are, and are not willing to pay so much. We can show you an advertisement in one of our city papers, which is headed "$20 reward;" which goes on to say, that the above reward will be given to any one who will come forward and swear, that they called for and obtained an Ambrotype from any gallery except his, in this city, put up *with or without two glasses*. Now, we would really like to know how much power a man is invested with, that owns an individual right to make Ambrotypes? Has he the power to ride rough shod over every one that makes pictures either negative or positive on glass. We know very well what Mr. Cutting's claim is, and are not to be intimidated by every scare-crow that is erected in our "field" of action.

Business generally is very dull in the city, and we cannot hear of much being done in the country. Our Legislature is now in session and one of us leave for Frankfort to-morrow with a "kit" prepared to take the notables, or any others, that will favor us with a sitting, perhaps we can find time and opportunity to get a few views of interest, if so, we will send you some.

Hoping to get your Journal soon,

We remain yours as ever,

Webster & Brother.

We briefly stated in our January issue, the causes influencing the delay in the issue of the Journal during the last year, and for the first two months of this, and we again call the serious attention of photographers throughout the country to the facts. They *must not forget* that we depend entirely upon them for well executed negatives from which to print our illustrations, and to them we have to look. In every other branch of business it is the practice for contributors of illustrations or communications affecting their own business, not only to furnish those illustrations and communications gratis to the public prints, but to pay for their insertion;but there are very few Photographers in this country who meet our wishes in this liberal manner; they not only wish to derive all the benefit that may be given to their names though the circulation of the Journal(and we can assure them there is no quarter of the globe where it is not taken) but they compel *us* to pay for the privilege they enjoy, and at the same time by their neglect and tardiness subject us to delay and loss— loss not only pecuniary, but in reputation. Now is this fair; is it just? We acknowledge, that the majority of our subscribers have cause to complain of us; but have we not *greater* reasons for complaining against those *who can* and *will not* aid us to advance *their own interests*? Knowing what they can do, can we be censured for condemning their treatment of us; or even for considering their excuses paltry and absurd. We do not think it would be difficult for us to prove to them, how much time and labour we devote to their interests,and how paltry is the remuneration we receive at their hands compared with that labour, and yet, our slightest back-slidings—even though beyond our control—a fact also easily proven—are visited upon us by the most annoying comments. Our friends Webster are not amenable to these complaints, (we take their comments only as a text upon which to preach our sermon) but there are very few, we are sorry to say, who are not.

We can go still further, and say that the spirit of illiberality, or rather of sound judgment is so rare, that notwithstanding we offer to pay for the use of negatives sent us, it is a very difficult matter to obtain them. Now, what is the excuse? "Want of time;" and yet in the very same breath we are told that business is dull by the very men who make the excuse.

Whose names among Photographers are the most widely known, not only in the United States, but in every part of the world? Are they not those who have made themselves conspicuous through the columns of our Journal and other kindred prints? Ask them.

We are not desirous of thus obtruding our services upon the attention of American Photographers; but we have claims upon their consideration, and while it shall be our greatest desire to push their interests in the most impartial and vigorous manner of which we are capable, we shall never be found backward in maintaining the rights justly your due, whenever the provocation shall arise.

We have the satisfaction of being fully aware that,throughout the world no other such periodical as ours is published, and that with all its defects—for we do not deny that it has many—it is not excelled. In its conduct we have always asked the advice and assistance of all, and have always accepted that which has been given with pleasure and profit—if we fail to fulfil all the requirements of our friends,they must share the resposibility with us, for we are merely the helmsmen, and if they who should assist us to sail the ship will not do their duty, the accidents which occur, are laid equally to their charge. For our past shortcomings we trust we shall make ample amends in the future. [Ed.

From La Lumiere.

ELECTRO ZINCONOGRAPHY.

Paris, Nov. 1855.

Mr. Editor:

I noticed in the November number of your valuable Journal the description of an electro-chemical engraving process. As this method is very similar to one invented three years ago by myself, for which, however, I did not take out a patent until the 8th of July, 1854, I take the liberty to present you the details of the process. You may judge what difference exists between them. My process which I style *galvanic Zinconography* acts in the printing press. It consists in transferring lithographic designs on stone or paper, or copper plate engravings to zinc. I draw directly an a plate of grained zinc with the common lithoprahic pencil, or with an insoluble pencil invented by myself which resists the action of acids or oxygen. The drawing finished, I prepare the zinc with a solution of gall nuts and gum arabic such as employed in lithography. I sprinkle over it a mixture composed of resin Judea Bitumen and Burgundy pitch. Then remove the excess and gently heat the back of the plate in order to melt the powder which mixes with the lithographic ink and thus forms a varnish. The plate is then bitten in by means of a galvanic battery. By this process I have reproduced lithographs taken with the lithographic pencil with the pen. I have also obtained photographs in relief which I had on exhibition (9089) at the Fair, and for which I was awarded a second class medal. I received this premium both for the Engraving process in question as well as for my reproductions of copper plate engraving, and other reproductions of insects, leaves, natural flowers, for copper plate impression which I obtain by means of casts taken with gutta percha. By this method we can put all sorts of engravings in relief, copper plate as well as typographical impressions, obtaining reproductions of designs on lithographic stone with the greatest facility.

Yours &c

L. Damont,

Engraver.

From the Jour. of the Phot. Soc.

MANUFACTURE OF PAPER.

To the Editor of the Photographic Journal:

Sir,—The difficulty of meeting with good paper for negatives induces me to jot down the following suggestions for its manufacture, and I hope some good natured fellow-craftsman will be induced "to try experience," for I feel certain the results will be satisfactory.

Instead of using the ordinary collection of rags, I would take *washed flax waste*, produced in abundance by the flax mills of Leeds (and easily obtained from Bently and Son, Mawson, or other of the rag dealers in the town), and bleach it in the usual manner, neutralizing the clorine, &c., by sulphate of soda, and afterwards washing it most thoroughly. I would size *in* the engine with farina, solely beating the stuff *fine*, and working a great deal of water on the mould.

My motive for recommending *flax* in this: the fibre is almost solid, not tubular as cotton; and I think the mixing of fibres so totally opposite in character is one of the sources of annoyance in ordinary paper; I am also of opinion that the usual method of sizing is objectionable, because the resin soap is precipitated by the alumina, which remains in the fibres, mixed mechanically; and the gelantine size coagulating in *patches* may result in strains. I write this note hurriedly, and time does not permit me to go further into detail; but any practical paper-maker will see my drift: it is to obtain a homogeneous paper *free from every objectionable ingredient.*

Yours faithfully, W.

ALBUMEN PROCESS ON PAPER.

By M. Victor Serre.

[From '*La Lumiere*,' Jan. 5, 1856.]

I use paper strongly sized with gelatine, or albumenized on both sides with a mixture of equal parts of albumen and water ; I prefer the latter. When the paper is dry I coagulate with a hot iron.

For the preparation of a sensitive surface, I use albumen iodized by iodide of ammonium, to which is added a little gum, sugar candy and sugar of milk. I sensitize on a solution of aceto-nitrate of silver of a strength of 5 per cent. When I wish to prepare several sheets, I take a plate of glass rather larger than the sheet of paper, and by means of a glass funnel pour upon it a quantity of the aceto-nitrate sufficient to sensitize the paper, which I immediately place upon it ; the sensitizing completed, I place the sheet in a dish full of ordinary water, repeating the operation with every sheet of paper. When they are all collected, I throw away the water ; renew it until what remains is perfectly clean,—a certain sign of the complete precipitation of the nitrate of silver. I then place in the dish, full of water, a small quantity of liquid ammonia, to dissolve the chloride of silver, and I agitate strongly for five or six minutes. Before going any further, I must remark upon a fact which I have not yet sufficiently studied, but which might lead to an instantaneous process with dry collodion. If the water is strongly alkalized, much sensibility is gained, but I have then almost always met with spotting. However, the fact deserves to be investigated, and I shall not fail to do so at my earliest leisure. The paper is next removed from the dish, well dried between blotting-paper, enclosed in a cover of clean paper and well pressed.

Theory here indicates, and time will demonstrate, that the sensitive layer should keep for a long time ; indeed, we have a layer of iodide of silver as pure as can be, and indecomposable except by light.* Experience proves that nitrate of silver is not necessary when exposing the plate to luminous radiation ; but only in the development of the image. This circumstance leads me to think that with well-prepared paper the exquisite sensibility of glass might be attained ; for a layer of iodide of silver giving the maximum of sensibility, it is clear that it is deposited on paper or glass, if care has been taken to form it upon paper previously sized with a substance without affinity for iodine and which will not let the air through.

To calculate the time of exposure, a trial must be made at home with the paper wet. The dry paper will not undergo a longer exposure, taking into account the light, diaphragm, and foliage. When returned to the laboratory, a film of aceto-nitrate solution (3 or 4 parts to 100) must be poured upon the glass plate, and the impressed side of the sheet of paper carefully deposited upon it ; after a few minutes the paper is to be plunged into a bath of saturated solution of gallic acid to which camphor has been added The image will soon appear, with the half-tints perfect and the blacks strong.

* It is possible that the atmosphere may produce decomposition of the iodide of silver. The fact deserves the attention of scientific men.

Personal & Art Intelligence.

— In another column will be found a very interesting and important communication from Mr. M. A. Root of Philadelphia, on "Photographic Patents." It will be seen by this article that the position we assumed in regard to this subject,at the start, was perfectly correct in every particular. In order to arrive at the facts stated in this communication Mr. Root went to considerable expense, by employing a gentlemen of high literary and scientific character, well versed in Patent Office business, to proceed to Washington and examine the public and private records of the Patent Office, and there is no doubt that we shall be enabled to fully establish the fact that all the patents in existence in this country for photographic formulas are perfectly worthless, and that our statements, at the beginning of this controversy, were correct in every particular. These articles on the "Photographic Patents" by Mr. Root will grow more and more interesting to their close, and will be of incalculable benefit to every one engaged in the Photographic Art, and we trust they will tend to make our friends more cautious in future in their purchase of patent rights. Mr. Root deserves the thanks of every photographer for the energy he has displayed in bringing this matter properly before the community.

The fact that Mr. Cutting's patent perfectly secures the use of balsam of fir for sealing two glasses together, is no reason why all should not practice the Ambrotype formula, which is perfectly free to all, and to which he has no shadow of claim. Neither does it prevent the use of two glasses when sealed (or cemented) together by any other substance. There are several varnishes that answer the same purpose equally as well—some say better—as balsam of fir. Mr. Simons of Richmond, says he uses the negative varnish, sold by Mr. Anthony of New York, as preferable to the balsam of fir. Mr. Anthony has lately succeeded in making a varnish as limpid as water, which has been partially tried by Mr. Brady—who has used the balsam—and pronounced excellent for the purpose. If, upon further trial, this article sustains the opinion formed of it on the first application, we shall note the fact in our next.

— Having appended a few remarks to a letter from our esteemed friends Webster & Bro in which we took occasion to speak rather warmly of certain facts in regard to the causes of our want of promptness, in the issue of our Journal, we deem it but right, in this place, to say, that our remarks are merely intended to exhonorate us in a measure from that censure which some have been disposed to give us, at the same time attributing our delays to causes which never existed. The illustration to the present number will give some idea what can be done, by way of illustrating our Journal when we have good negatives. While "looking upon this picture," it must be borne in mind, that our manipulator has had but three or four weeks of clear weather in experience, with only such instructions as we were enabled to give her, suggestively, in the evening after our return home from business. The instruction of a good practical photographer she has never yet had. Mr. A. A. Turner, however, has consented to instruct her in his process, after which, we feel assured, we shall be able to furnish our subscribers with photographs equal to any made. Those who send us the best of negatives to print from, will not only have the benefit of the reputation he will acquire, by doing so, among his brethren, but will be specially noticed in the *Home Garland*,

(a family paper we shall shortly issue) a paper which bids fair to have a very extensive circulation throughout the country, among the very first families. We merely mention this as an incentive to good productions; for we feel confident it will be very beneficial to the Art generally.

— The Members of the Photographic Exchange Club are certainly very delinquent in furnishing their exchanges. The following gentlemen only have as yet sent in their photographs. Messrs. Guillou, Ehrmann, Brown and M'Clees of Phila., Pa.; Mr. Vannerson of Washington; Messrs. Webster & Bro. of Louisville, Mr. Schoonmaker of Albany, We have distributed those only that have been called for, for the reason, that we were in hopes of soon receiving sufficient to make respectable express packages, as it will cost no more to send fifty to any part of the country than ten or twelve. With the Messrs. Websters we have doubts of the stability of the Club. There does not seem to be that interest for it, on the part of its members, that it should command. We trust it friends will be more active.

— There has been a rumor lately that Mr. Hill has announced in one or two obscure country papers that he is ready to impart his Hillotype process on the basis of the proposition we made to him three or four years ago. If this is the case, why does he not adopt the only course that will secure this result—Exhibit his pictures publicly in New York and invite scrutiny. But this would not answer his purpose. There is also a rumor that he is in treaty with Mr. M. A. Root for the sale of his process; but this cannot be true, as we know that he has offered it to a gentleman of New York, on terms that are certainly not in accordance with his former estimate of its value. We would ask; what becomes of his arrangement with Mr. Hunt of Ohio, if Mr. De F. accepts his proposition. This matter grows darker and darker as it grows older.

— M. Van Monckoven of France has communicated to M. L'Abbé Moiguo, in a recent letter, the fact that he has succeeded in obtaining directly on glass the principal colors of the spectrum. He says:—"I hope to entertain you with the results I have arrived at in your city of Paris, if you will condescend to receive me. You cannot conceive of the truly astonishing effect produced by a picture giving when viewed by reflected light the direct; or by transparency the complimentary colors." M. Monckhoven is a man of sincerity, cultivating the beautiful art of Photography with a true desire for its improvement, and we are anxious to know what he has added to the results of M. Becquerel, M. Niepce de Saint Victor and others.

Mrs. A. M. Armstrong—We owe you an apology for not answering your letter; but every moment of our time that health would permit has been so fully taken up that we found it impossible to do so. We think you will find full explanation of the cause of your difficulty in "Hardwich's Manual"; Art. "Direct Positives." (Page 330, vol. VIII. P. & F. A. J.)

M. J. Gurney—We answered your letter upon its receipt. The *negatives* will be more than acceptable as we have had nothing of the kind, as yet, from your section of the country.

A. C. Partridge—This gentleman is about opening a new, more extensive and more beautiful set of rooms in Wheeling, Va., with the intention of prosecuting every branch of the Photographic Art. Mr. Partridge is one of those skillful artists who commands success, and always secures it.

— In our November number we were led into an error—by the paper from which we made the extract—in regard to the "*Wisconsin State Fair.*" The following gentlemen were the recepients of the *prizes*:

First Premium for best Daguerreotypes to A. Hesler of Chicago.			
Second "	"	"	H. S. Brown, of Milwaukie.
First "	"	Ambrotypes	H. S. Brown, "
Second "	"	"	Pendergast, Wilson & Co "

Mr. Hesler was the only one who exhibited Photographs.

J. E. Whitney—The reasons for delay have been already stated. The missing numbers have been sent; but we shall not use the order.

A. C. M'Intyre—Certainly not. You are undoubtedly in possession of the true reasons by this time.

— C. H. Remington—This gentleman still pursues the Daguerrean Art in Thomasville, Ga., with skill and success. Mr. Remington visits the North shortly for the purpose of mastering other branches of the art.

— J. Buxton—The fault is in the post. Your numbers have been mailed regularly. The Journal is in a most prosperous condition.

— C. Dart—We have not yet printed a list, but will do so, as soon as the collection is sufficiently large. In this matter, as well as every other, where dollars and cents are not tangible to the sight, the producers of the article are very obtuse to their own interests.

— G. N. Granniss—This artist has become a permanent fixture at Waterbury, Conn., and the good people of that town may well congratulate themselves on having so excellent a representative of the Photographic Art among them. They need not leave home for a good portrait while he remains.

— J. H. Masury—The works have been forwarded by *Well's Express.* We have no doubt the other matter is all right; but we have no supervision over it. Will attend to your request.

— D. C. Williams.—We have no doubt that it is all correct. The gentleman should have been more explicit at the time, and we should not have fallen into the error.

— S. M. Eby—Your letter was late in coming to hand. We trust you are satisfied that your fears were unfounded.

— C. W. Dill—Your request has been complied with and we trust your expectations will be fully realized.

— Wells H. White—We shall not trouble you further in the matter. If you are not now fully satisfied you never will be. The matter has ended very different from what we expected.

— W. B. Benson—Your query is partially answered in another paragraph. There is some fact and much fiction mixed up in the matter. We should judge, from recent facts which have come to our knowledge that there is very little sincerity in the man.

— M. M. Mallon—I have not seen it—see advertisement for another. The Photographer referred to does take excellent Ambrotypes. You must use the acetic acid with caution. The articles have been sent.

— J. F. Hamilton—It never has been received.

— S. D. Cutting—We have written you on the subject—since which we have received you second letter; both satisfactory.

— H. F. Sherrill—The Messrs. Gurney & Fredericks and Meade & Bros. of this city can execute the portraits for you in the best style. If you prefer it you can have them done nearer home, by Mr. Porter, or Mr. Faris, of Cincinnati, Ohio, or by Webster & Bro., of Louisville, equally well.

— A. Hesler—Try and send two or three popular scenes. Something is looked for from you. The copies sent are excellent.

— Who shall Win the Prize?—Which one of our Daguerrean artists throughout the country will take the premium for executing the picture of the handsomest ladies for the Gallery of Beauty? The rivalry is very great. Some of the pictures already sent in are admirable specimens of the art, and it is thought that, as a whole, the pictures in the Gallery will surpass any collection of the kind ever yet made in the United States. Messrs. Greenwood & Butler, the new proprietors of Barnum's Museum, are energetically engaged in hurrying up the exhibition. It will be a splendid thing.

Errata in Article Headed—*On a Photographic Method for determining the height of the clouds.*—January No.

Page 4, 1st column, line 7, instead of *observers* read *observer.* Page 4, 2nd column, line 51, instead of $m = 0.600$ read $m = 0^{m}\ 6006$. Page 4, 2nd column line 52, instead of $6+10$ read $\frac{6}{10}$. Page 4, 2nd column, line 53, for *focal,* read *principal focal.* Page 5, 1st column, line 3, for *retained,* read *attained,* Page 5, 1st column, line 5, for *double the distance,* read *for the interval of* 100 *metres which.* Page 5, 1st column, line 19, for $\frac{1}{2} \angle h^2\ 4d^2$ read $\frac{1}{2} \sqrt{h^2 4d^2}$ } Page 5, 1st column, line 20, for *direction* read *dimensions.* Page 5, 1st column, line 23, $\frac{d}{2}\sqrt{\ }(c-2)\ (c+2)$ read $\frac{d}{2}\sqrt{(c-2)\ (c+^2)}$ Page 5, 1st column, line 69, for *found,* read *formed.* Page 5, 2nd col., line 21, for $h = d\,f$ read $h = \frac{d\,f}{p}$ } Page 5, 2nd column, line 30, for *two images of the cloud,* read *any one point (a) of the cloud whatever.* Page 5, 2nd column, line 27, for *if these prove* read *then from what.* Page 5, 2nd column, line 40, for *amologous* read *homologous.* Page 6, 1st column, line 54, for *by the processes,* read *in the case of.*

MR. CHARLES POPE.

Negative by J. H. Fitzgibbon, of St. Louis, Mo.

PRACTICAL TREATISE
On the Employment of Commercial Papers in Photography.

NEW IMPROVING PROCESSES.

Preparations preliminary to the Waxing and use of the Sensitive Baths for Positive and Negative Proofs.

Translated from the French of STEPHEN GEOFFRAY *by* W. GRIGG, A.B.

SUFFICIENT has been said concerning the preference to be accorded to paper over glass in the practise of photography. I think the question admits of no further argument; to do so would be to abuse language and waste time. Still, we will admit, that valuable advantages are connected with glass of which paper is deprived, and which it seems long ere it will possess.

Whence does it arise that this superiority in certain particulars of the former over the latter substance still exist? Why are impressions on paper generally so inferior in point of clearness to pictures on glass? Why is a rapid and sure paper a thing so difficult to obtain? Is it the fault of the paper, or must it be charged to the sensitizing process. Both have their defects, and if these defects have not yet been corrected, it is either because we have not been willing or have not known how, to consider them together. Thus, for instance, he who accuses his paper forgets that at the same time his process should share in the accusation, and *vice versa*.

In fact among the savans and numerous practitioners who have written on the subject, some have pretended to find exclusively in such or such a sensitive process the *sure* method of perfecting *all* commercial papers; some have discovered the remedy for everything in a different composition of the paper, yet to be discovered, however; and, lastly, a vast number have thought that even with the present composition of the paper, if its manufacture became a *more special* matter and greater care was given to it, all would be accomplished.*

Are not all laboring under false ideas? The first have gone too far with their formulas and have occupied their attention too exclusively with the PROCESS; the second have too soon despaired of the methods at present in vogue and are improvident in their expectations. The last lose sight of certain practical difficulties, which every manufacturer, no matter how intelligent or attentive to business, or how well disposed he may be to make great sacrifices, will necessarily be obliged, very unfortunately for ourselves, to undergo. I consider, on the contrary, that the sensitive process has attained sufficient *perfection* to quiet at least the aspirations of the photographer. The manufacture of the paper, in my opinion, if proper care be given it† (if not as actually carried on,) should satisfy us for a long time to come.

Lastly, I think that while we may desire that greater care, assiduity and skill be brought to bear in the manufacture of the paper, it is unreasonable to expect in our day commercial paper of such perfect preparation as to satisfy all the requirements of the complicated art of photography.‡

Being anxious to work quick and well, and especially to free myself from the venders of *choice* papers, I directed my attention to the methods of operating in the best possible manner with the simplest resources, easy to be found in every country.

The investigation I have gone into for this purpose on the various sensitizing processes and on their different modes of action in different cases, on the composition and manufacture of the papers in every phase of the process, have at length convinced me that it was wise to study the utilization of the papers now in use.

The only method which has appeared to me to be neither chimerical or ruinous, but practicable and giving sound results was to modify the papers myself, *each* according to its acknowledged defects, then to sensitize according to its nature and the purpose for which it is designed. I shall hereafter impart what experience has taught me in regard to the relative value of the numerous sensitizing processes and on their employment under whatever different circumstances we may work. At the present time I present to the photographic public the improving processes,—thanks to which I can obtain good negatives on ordinary papers,—with the circumstantial observations I have made on papers of widely different nature furnished by commerce.

The following lines were dictated to me by the desire to prevent the fatigue, the mortification and the uncertainty I have experienced and which affect all who practice the difficult art of photography. Happy shall I be if I shall have directed them over the right road; if after having distinctly shown the evil, I have found effectual remedies! My intention was to make this a small though useful practical treatise; I have therefore avoided all color of theory and all chance digression, avoided everything unnecessary to the understanding of my descriptions and the correct applications of the formulas advised; I have endeavored to be at once clear and precise.

I have kept nothing back, moreover, which might be of any benefit to my readers; the success of a large number of them will, I hope, prove my correctness.

STEPHEN GEOFFRAY.

Roanne, March 1st, 1855.

COMPOSITION AND PREPARATION OF COMMERCIAL PAPERS.

SEC. I. Numerous are the defects which photographers charge to commercial papers.* Some may be partially overcome, others, if I may so speak, have an essential, fatal existence; others again sometimes take the form of real properties; thanks to which heliography is not only a process, but an art, whose productions may be varied according to the good taste and talent of the operator in reference to the subject to be taken and the effects to be produced.†

SEC. 2. The study of these defects in their cause, whether they still remain as disadvantages or afterwards become advantageous, is important. To render it useful we will consider it seriously.

SEC. 3. The paper is a pulp divided into sheets of greater or less thickness, and sized according to the purpose for which it is designed by various mucilages which give it consistency, and diminish in a greater or less degree the premeability of its fibres.

SEC. 4. This pulp is composed of cellulose of different degrees of purity‡. Now, as all vegetables furnish this substance in

* The efforts of Messrs. W. Stones and H. Saunders, paper manufacturers, England, promise much. Let us hope that Messrs. Blanchet and Canson will also give serious and special attention to photographic papers.

† Read the very judicious article published by Mr. Basset in the *Propagateur* on photographic paper. This scientific gentleman has given the only sound advice I have discovered in any work published on the subject. "Why," says he "does not the photographer even prepare his paper himself?"

‡ Messrs. Fabre de Romans and Legray have the honor of being the first in effectually improving commercial paper. I regret my inability at the present time to credit all who have succeeded these gentlemen. This would constitute a history of photography impossible to give in the present work.

* I need scarcely observe that I shall merely have to do with white papers of fine pulp. I most assuredly make no pretension of being able to better papers possessing every imperfection.

† The same causes which sometimes deprive pictures on paper of all desirable delicacy, also enable us to obtain effects of the most exquisite softness in the lines and harmony in the perspective.

‡ It has been admitted that the substance forming the cellular tissue of all plants, is identical in respect to its chemical composition, not only in every portion of the same plant, but in every other vegetable. The cellular tissue of all the other elements which constitute the latter is distinguished by a somewhat strong resistance to the action of the chemical agents. This property renders its separation easy from the substances

various quantities, we can easily understand why the different *kinds* used in the manufacture of paper have been and will still continue to be so numerous. Excellent paper has been made with cotton, hemp and linen employed together or separately* Fine paper, however, at the present day is the result of a certain treatment of the remnants of different tissues. Rags which have undergone long usage, give the finest results in the shortest space of time and the least expense.

Sec. 5. Cloth waste, drillings, street rags and buntings are names applied to rags according to the place where they are obtained.† They are remnants of old linen flax, cotton and hemp‡ and are filled with impurities of all kinds, coloring matter, earthy substances, grease, etc. The manufacturer first assorts them according to age and wearage, and difference of tissues which do not all possess equal resistance. This assorting is highly essential, for on it depends the purity, the equality and *uniformity* of the gluten of the paper.

Sec. 6. Rags, divided into united tissues and crossed tissues, are again separated in two classes, white rags obtained from white cloths, and black rags, which are remnants of colored or common stuffs. White rags are assorted into four classes, superfine, fine, middle fine and common ; seams and borders are laid aside.

Among the black, fine rags colored by the dyeing process, (neither red nor blue, however,) are also employed in the manufacture of ornamental papers.

Rags assorted, as has just been stated should be carefully, cleaned and washed.

Sec. 7. Whatever be the system of the cleaning machines, their purpose is to powerfully agitate and beat up the dry rags. The dust, straw and earthy matter which they contain, fall as they become separated through the meshes of a metallic seive.

Sec. 8. The washing is performed by steam. The rags are first steeped for several hours in a solution of potash or soda in water ; they are freed from the excess of the alkaline solution, and are then cast into vats, and the steam thrown upon them.

This (ley) washing is highly advantageous for the subsequent operation, even in the manufacture of photographic papers. The natural coloration disappears by this process, and there will be no occasion to bleach the pulp by the reaction of so great a quantity of chlorides ; the rags will also become sufficiently softened by this process and well prepared for the grinding operation.

Sec. 9. The rags are then transferred to the *cutting machine*, composed of a number of blades resembling scissors. The object of this operation called sorting is to divide the rags whose exterior only has been whitened.

Sec. 10. The rags are then put into a sort of wooden mortar called piles, containing water. Here they undergo the action of three systems of hammers. The first set, called *unravelling* or dividing hammers, are covered with sharp pointed nails which destroy the tissue of the stuff and reduce the substances submitted to their action into a mass of small fibrous threads, inclined to felt.

The refining hammers are either armed with smooth headed nails or a great number of small pointed nails. They beat the whole mass up until it becomes perfectly uniform and composed of very minute filaments, without any whitish particles. There yet remains the *reducing* process. The design of this operation is to uniformly dilute the pulp in some suitable vehicle* and at the same time soften it by the action of the third system of hammers. The latter are generally smooth. In this third trituration the pulp should lose all its inequalities. The greatest care is required in this operation as on it depends the homogeneousness of the paper as also its transparency.

At the present day, the mallets or hammers of which we have just spoken have been replaced in a large number of manufactories by cylinders covered with sharp metal cogs, which revolve against a similarly cogged plate of metal.

Sec. 11. The lye wash above described does not always bleach the rags so as to furnish a sufficiently pure pulp, to render the paper marketable ; the steam, moreover, is insufficient to destroy the color, if not *natural*. It is therefore most generally necessary to remove it chemically from the *pulp* by another operation. The chloride of lime, and baryta dissolved in water in various proportions, dry chloride of lime l'eau de javelle† or chlorine in the gaseous state are employed for this purpose We shall presently see how highly important is the choice of the reagent we employ.

Sec. 12. The rags having been well triturated and reduced to the pulp state in the piles and again bleached are ready to form the *paper stuff*. The mass is then transferred to the *working vat*. This is an immense vessel of wood surrounded with iron and often covered on the inside with sheet lead. At the bottom is an opening of from $11\frac{3}{4}$ to $15\frac{3}{4}$ in. diameter, beneath which a boiler of red copper is fitted and well strengthened. The pulp is then stirred in the vat either by machinery or by hand while a fire beneath the boiler keeps the compound of water and cellulose at a suitable temperature.

Sec. 13. At the proper moment the pulp is thrown by means of facets upon a metal seive when the excess of water drains off. It is then spread in its thick state by the machinery, along a cylinder heated by steam, where it is pressed and formed into sheets. In this state it is carried by means of a woolen sheet moving on rollers between another set of brass cylinders heated in the same manner. It will soon acquire consistency and is then dried, and may then without danger be transferred to the polishers where its surface is equalized and in a greater or less degree freed from the asperities and granular substances it may still retain.‡

Sec. 14. Paper thus made would be unfit for the uses to which ornamental papers are designed. It lacks consistency, is very permeable and its power of absorption is obviously irregular. These defects are remedied by the sizings, the various applications of which we shall proceed to describe, as it is of the highest importance in the exercise of our art.

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united with it. It is extracted by submitting the different parts of the plant to successive chemical reactions, which destroy the more decomposable substances with which it is united.

Cellulose when pure is of a white transparent color, if its state of aggregation be not very considerable, it is insoluble in water, but decomposes at length when exposed to air and moisture. This substance is isomeric with common or improved starch ; it acts in the same manner as this substance with acids and most of the powerful reagents. This valuable analogy is brought to bear in the improvement of paper, as will be seen in the following pages.

The chemical composition of cellulose, as also that of starch is :—

Carbon,	43.59
Hydrogen	6.20
Oxygen	50.21
	100.00

* The products of the vegetable kingdom which have been tried and even employed in the manufacture of paper are numerous ; bullen, Spanish broom, wheat straw, rye or rice, liquorice bark, the woody parts of the nettle, hops, maize, liane (a sort of convolvulus or bird weed), the pulps of beet root, the stem and flower of the goldylock, clover, etc. etc., have furnished specimens of paper highly satisfactory.

† The following are a few of the names given by our manufacters to the various kinds of rags :

1st and 2nd Whites.
Colored Rags.
Mixed Country Rags.
Old Canvass.
Cotton Waste.
Oily Threads.
Spinner's Waste.
Woolen.
Straw.
Ropes.
Rags gathered in the country are deemed superior.—*Translator*.

‡ It would be well as regards the homogeneousness of the gluten of the papers that each vegetable genus be only used in the manufacture of such paper. In fact it is highly probable that the cellulose obtained from each variety possesses a different power of absorption or resistance.

* Water of greater or less purity, is mixed purposely sometimes with bleaching substances, sometimes also with sizing matter, if this operation is not to take place after fabrication.

† A bleaching liquid composed of hypochloride of potash.

‡ It is to be remarked that if the surface of the paper become perfectly freed from grains, they none the less exist in its substance and form so many points possessing less power of absorbing the liquids, greater refraction, less translucidness, and capable of receiving the sensitive substance in various quantities.

Sec. 15. We have designedly omitted the sizing in the vat, which is generally practised at the present day. We therefore suppose the paper to have been obtained (in regard to the sizing) by the old method, and is to be passed in its finished state into the gelatine or other mucilaginous baths. The sheets are previously examined one by one and purified if necessary. They are divided into two principal sorts. Sheets possessing irremidiable defects are discarded altogether; others which may be freed from lumps, knots, etc., and laid on one side to be delivered to the workmen who pick them out with fine nippers and scrapers, and entirely remove the knots, threads and hetrogeneous substances they may contain.

Sec. 16. Papers sized in the vat are likewise submitted to this operation before they are sent to market; but the consequences connected with it which we shall designate are much more fatal.

Sec. 17. The sizings vary according to their mode of employment, the resources of the locality and the system of the manufacturer.

Sec. 18. It would be impossible to give the greater part of the formulas in use; we shall simply designate the elements of the different receipts giving a general idea sufficient to show the advantages and disadvantages of the *sizing* process as practised in the manufactories.

Sec. 19. The sizes used in the old system are composed of animal gelatin and alum, (bisulphate of alumina and potassa), to which substances soap is often added. They are prepared in very different ways with materials of various degrees of purity. The size is also prepared under conditions of greater or less advantage.*

Sec. 20. The sizing is done by hand. The paper slightly moist is steeped in vats contaiug the size in solution which is of different degrees of whiteness and clarification and of varied temperature. Drying the sized sheets has also its importance.†

Sec. 21. Sizing in the piles and vat is accomplished by mixing with the pulp, before it has become stuff, the *mucilage* which is to give it the desired qualities.

Sec. 22. This mucilage is still more varied in its composition than the above. Its base is sometimes farinaceous sometimes resinous, sometimes both, often associated with saponified waxes, with an addition of alum, soaps, various gelatines, sub-carbonate of soda, lime, &c.‡

Sec. 23. Before retailing these papers the manufacturer or merchant presses them either between sheets of zinc or steel or flatteners of polished iron so as to crush the grains, smooth the surface and give it a glossy and beautiful appearance, which however is often detrimental to us.

* The greater or less penetration of the size into the tissue is in proportion to the correct moisteuing of the paper. The temperature of the size, which when too high is injurious to the texture, and when too low does not penetrate, its density being too thick, as it only attaches itself to the surface and falls when the paper is dry, and when too clear does not size sufficiently is a circumstance which has a great influence on the value of paper designed for photographic purposes.

† The state of the season and the temperature of the atmosphere during the drying process have an important influence on the mode of sizing. The slower the process the more the size accumulates on the surface of the paper. The size becomes better disseminated through the pulp by rapid drying, but the sizing appears to be more light on account of its minute division.

‡ The two latter substances are employed to purify the water used in the manufacture, to facilitate the dissolution of the soaps.

(*To be Continued.*)

According to the opinion of many, there are periodic changes in the human system, life being a scale of progression, a grand staircase of years, approaching the grand climacteric step which is but a short remove from the grave. These periodic changes, or critical periods, are supposed to occur once in seven years, and that in those seven years the body undergoes a complete change. The age of sixty-three is considered as the grand climacteric, or most critical period of life. It is not known that there is any record to show the foundation or correctness of this belief.

For the Photographic and Fine Art Journal.

THE AMBROTYPE PATENT.

Richmond, Va., March 1, 1856.

Dear Snelling—You know I promised, that if anything further turned up relative to the matter between the Patent man and myself, that I would write you again. I accordingly, with great pleasure, keep my promise. It appears that these patent right or rather patent *wrong* men, are not satisfied yet, but talk of bringing the matter up again, to be tried before Chief Justice Taney, who will sit in this city next May. I have no fears of the result. I feel safe in relying upon the Judge's long experience in such matters. He has said on a former occasion that a *principle* cannot be patented, and what is it but a principle they are contending for? Nothing else will suit them. I do not use balsam—and they admit it—but still they say that I infringe, when in fact balsam is the only thing that belongs to them according to their own claim which reads thus: "I claim the combination of balsam with photographic pictures on glass and with the additional glass by which they with the balsam are heremetically sealed." It is very clear that the patent is for a combination; use balsam with slate on any similar material, in place of the extra glass and you do not infringe; use the extra glass and seal with any article except balsam and you do not infringe. I use a varnish which is superior to balsam, for if I thought balsam the best, I would not hesitate to recommend it, as I believe it to be public property. There is no doubt but what the whole patent is an imposition upon the public. I deny that it is novel. Mr. Cutting admits that microscopic slides and lenses have been sealed with balsam, but remains perfectly silent upon the subject that daguerreotypes have also been sealed with balsam in a similar manner, a fact which I proved in court to the satisfaction of all except the patent man and his counsel, by a little book called "Hints on the Daguerreotype," published in 1853—Carey & Hart, Philadelphia. It is strange that it should have devolved upon one so humble as myself to expose the flimsiness of the Cutting patent; but, although humble, I have always been on the alert to put down such clap-trap humbuggery and humbugs. Is it not a lamentable fact that we have no Hardwichs, Paynes, Archers, and many others who have so liberally given their time and experience to the public "without money and without price." However, there is no doubt, but that men of talent in this country are deterred from taking their course, by seeing the labors of others taken from them, without even saying "with your leave" and by men too as destitute of genius as they are of principle, who make a slight alteration in the original formula, never of any use and mostly a detriment, but this is of no consequence to pure patent seekers, if they can only get a patent, that they may offer "*rights for sale to respectable operators*," (*i. e.*) if respectable enough to pay a respectable price.

Yours truly, M. P. Simons.

NEUTRALIZATION OF THE NITRATE BATH.

To the Editor of the Photographic Journal.

Sir—Having a nitrate of silver bath (the usual 30-grain solution without the addition of acid), and which I had exclusively used for the collodion process till about eighteen months ago I was obliged to give it up, in fact lay it aside as useless, from causing fogginess upon development, all over the plate (experienced to a greater or less extent by all photographers), the following simple process suggested itself to me a few days ago as likely to cure it, from having used it before for acidity in liquids.

Attach a very small bit of rough marble (white I generally use) to a thread, which fasten in such a way that the marble will hang about the middle of the nitrate bath; in a day or two the desired change will be effected. My bath is now in excellent working order; and having communicated the result of my experiment to a professional photographer in this city, in whose hands it has proved equally successful, I shall be glad if you give it publicity in your Journal.

I am, Sir, your most obedient Servant, Y. J. F.

A MANUAL OF PHOTOGRAPHIC CHEMISTRY,*
Including the Practice of the Collodion Process.

BY T. FREDERICK HARDWICH.

CHAPTER II.—CONTINUED.

VOCABULARY OF PHOTOGRAPHIC CHEMICALS.

NITRATE OF SILVER. *See* SILVER, NITRATE OF.

NITRO-HYDROCHLORIC ACID.

Symbol, NO_4+Cl.

This Liquid is the Aqua-regia of the old alchemists. It is produced by mixing together Nitric and Hydrochloric acids: the Oxygen contained in the former combines with the Hydrogen of the latter, forming water and liberating Chlorine, thus:—

$$NO_5+HCl=NO_4+HO+Cl.$$

The presence of free Chlorine confers on the mixture the power of disolving Gold and Platinum, which neither of the two acids possessed seperately. In preparing Aqua-regia it is usual to mix one part, by measure, of Nitric Acid with four of Hydrochloric Acid, and to dilute with an equal bulk of water. The application of a gentle heat assists the solution of the metal; but if the temperature rises to the boiling point, a voilent effervescence and escape of Chlorine takes place.

NITRO-SULPHURIC ACID.

For the chemistry of this acid liquid, see page 201, vol. viii.

OXYGEN.

Symbol, O. Atomic weight, 8.

Oxygen gas may be obtained by heating Nitrate of Potash to redness, but in that case it is contaminated with a portion of Nitrogen. The salt termed Chlorate of Potash (the composition of which is closely analogous to that of the Nitrate, Chlorine being substitnted for Nitrogen)yields abundance of pure Oxygen gas on the application of heat, and leaves behind Chloride of Potassium.

Chemical properties.—Oxygen combines eagerly with many of the chemical elements, forming Oxides. This chemical affinity however is not well seen when the elementary body is exposed to the action of *Oxygen in the gaseous form.* It is *nascent* Oxygen which acts most powfully as an oxidizer. By nascent Oxygen is meant Oxygen on the point of seperation from other elementary atoms with which it was previously associated; it may then be considered to be in the liquid form, and hence it comes more perfectly into contact with the particles of the body to be oxidized.

Illustrations of the superior chemical energy of nascent Oxygen are numerous, but none perhaps are more striking than the mild and gradual oxidizing influence exerted by atmospheric air, as compared with the violent action of Nitric Acid and bodies of that class which contain Oxygen losely combined.

POTASH.

Symbol, $KO+HO$. Atomic weight, 57.

Potash is obtained by separating the Carbonic Acid from Carbonate of Potash by means of caustic Lime. Lime is a more feeble base than Potash, but the Carbonate of Lime, being *insoluble* in water, is at once formed on adding milk of Lime to solution of Carbonate of Potash. (See page 14.)

Properties.—Usually met with in the form of solid lumps, or in cylindrical sticks, which are formed by melting thé Potash and running it into a mould. It always contains one atom of water, which cannot be driven off by the application of heat.

Potash is soluble, almost to any extent in water, much heat being evolved. The solution is powerfully alkaline (see page 12), and acts rapidly upon the skin; it dissolves fatty and resinous bodies, converting them into soaps. Solution of Potash absorbs Carbonic Acid quickly from the air, and should therefore be preserved in stoppered bottles; the glass stoppers must be wiped occasionally, in order to prevent them from becoming immovably fixed by the solvent action of the Potash upon the Silica of the glass.

The Liquor Potassæ of the London Pharmacopæia has a sp. gr. of 1·063, and contains about 5 per cent. of real Potash. It is usually contaminated with *Carbonate* of Potash, which causes it to effervesce on the addition of acids: also, to a less extent with Sulphate of Potash, Chloride of Potassium, Silica, etc.

POTASH, CARBONATE OF.

Symbol, $KO\ CO_2$. Atomic weight 70.

The impure Carbonate of Potash, termed *Pearlash,* is obtained from the ashes of wood and vegetable matter, in the same manner as Carbonate of Soda is prepared from the ashes of seaweeds. Salts of Potash and of soda appear essential to vegetation, and hence they are absorbed and appropriated by the living tissues of the plant. They exist in the vegetable structure, combined with organic acids; in the form of salts, like the Oxalate, Tartrate, ect., which when burned are converted into Carbonates.

Properties.—The Pearlash of commerce contains large and varible quantities of Chloride of Potassium, Sulphate of Potash, etc. A purer Carbonate is sold, which is free from Sulphates, and with only a trace of Chlorides. Carbonate of Potash is a strongly alkaline salt, deliquescent, and soluble in twice its weight of cold water; insoluble in Alcohol, and employed to deprive it of water.

POTASH, BICARONATE OF.

Symbol, $KO\ CO_2+HO\ CO_2$. Atomic weight, 101.

This is formed by passing a stream of Carbonic Acid gas into a solution of the neutral Carbonate. It crystallizes nicely in large hydrated prisms, which are not deliquescent, and are more easily freed from impurities than the Protocarbonate of Potash.

PYROGALLIC ACID.

Symbol, $C_8H_4O_4$ (Stenhouse). Atomic weight, 84.

The chemistry of Pyrogallic Acid has been described at page 180, vol. viii.

SEL D'OR. *See* GOLD, HYPOSULPHITE OF.

SILVER, OXIDE OF.

Symbol, AgO. Atomic weight, 116.

This compound has already been described in Part 1, p. 176.

SILVES, CHLORIDE OF.

Symbol, AgCl. Atomic weight, 144.

The preparation and properties of Chloride of Silver are given in Part 1. page 176.

SILVER, BROMIDE OF.

Symbol, AgBr. Atomic weight, 186.

See Part 1. page 176.

SILVER, IODIDE OF.

Symbol, AgI. Atomic weight, 234,

See Part 1. page 176.

SILVER, FLUORIDE OF.

Symbol, AgF. Atomic weight, 127.

This compound differs from those just described in being soluble in water. The dry salt fuses on being heated, and is reduced by a higher temperature, and also on exposure to light.

SILVER, BROMO-IODIDE OF.

The name *Bromo-Iodide of silver* has been given to the com-

* Continued from page 41, vol. ix. No. ii.

pound formed by acting upon mettallic Silver with the vapours of Iodine and Bromine successively; also to the mixed Salt obtained by decomposing Bromide and Iodide of Potassium, in the proper atomic proportions, by Nitrate of Silver. A third process sometimes followed for obtaining the Bromo-Iodide of Silver viz. by the addition of *water* to a solution of Bromide and Iodide of Silver in Iodide of Potassium, appears to be founded upon wrong data, since there are good reasons for supposing that the whole of the Bromine in that case remains in solution, combined with potassium, and that the precipitate consists of pure Iodide of Silver free from Bromide.

SILVER, SULPHURET OF.

Symbol, HgS. Atomic weight, 124.

This is a black compound, formed by the action of Sulphur upon metallic Silver, or of Sulphuretted Hydrogen, or Hydrosulphate of ammonia, upon the Salts; the decomposition of Hyposulphite of Silver also furnishes the black Sulphuret.

Sulphuret of Silver is insoluble in water, and nearly or perfectly so in those substances which dissolve the Chloride, Bromide, and Iodide, such as Ammonia, Hyposulphites, Cyanides, ect. ; but it dissolves in Nitric Acid, being converted into soluble Sulphate and Nitrate of Silver. (See page 71.)

SILVER, NITRATE OF.

Symbol, AgO NO_5. Atomic weight, 170.

The preparation and properties of this salt have been explained at page 175, Part 1.

SILVER, AMMONIO-NITRATE OF.

Crystallized Nitrate of Silver absorbs Ammoniacal gas rapidly, with production of heat sufficient to fuse the resulting compound, which is white, and consists of 100 parts of the Nitrate +29·5 of Ammonia.

The compound however which photographers employ, under the name of ammonio-Nitrate of Silver, may be viewed more simply as a solution of the Oxide of Silver in Ammonia, without reference to any *salt* of Ammonia, such as the Nitrate, which may be associated with it.

For the preparation and properties of Ammonio-Nitrate of Silver, see pp. 292 and 362.

SILVER, NITRITE OF.

Symbol, AgO NO_3. Atomic weight, 154

The Nitrite of Silver is a compound of Nitrous Acid, or NO_3, with Oxide of Silver. It is formed by heating Nitrate of Silver, so as to drive off a portion of its Oxygen, or more conveniently, by mixing Nitrate of Silver and Nitrate of Potash in equal parts, fusing strongly, and dissolving in a small quantity of boiling water; on cooling, the Nitrite crystallizes out, and may be purified by pressing in blotting-paper. Mr. Hadow describes an economical method of preparing Nitrite of Silver in quantity, viz. by heating 1 part of Starch in 8 of Nitric Acid of 1·25 specific gravity, and conducting the evolved gases into a solution of pure Carbonate of soda until all effervescence has ceased. The Nitrite of soda thus formed is afterwards added to Nitrate of Silver in the usual way.

Properties.—Nitrite of Silver is soluble in 120 parts of cold water; easily soluble in boiling water, and crystallizes, on cooling, in long slender needles. It has a certain degree of affinity for Oxygen, and tends to pass into the condition of Nitrate of Silver; but it is probable that its Photographic qualities depend more upon a decomposition of the salt and liberation of Nitrous Acid

Properties of Nitrous Acid.—This substance possesses very feeble acid properties, its salts being decomposed even by Acetic Acid. It is an unstable body, and splits up, in contact with water, into binoxide of Nitrogen and Nitric Acid. The Peroxide of Nitrogen, NO_4, is also decomposed by water into Nitric Acid and Nitric Oxide or Binoxide of Nitrogen.

SILVER, ACETATE OF.

Symbol, AgO $(C_4H_3O_3)$. Atomic weight, 167.

This is a difficultly soluble salt, deposited in lamellar crystals when an Acetate is added to a strong solution of Nitrate of Silver. If *Acetic Acid* be used in place of an Acetate, the Acetate of Silver does not fall so readily, since the Nitric Acid which would then be liberated impedes the decomposition.

SILVER, HYPOSULPHITE OF.

Symbol, AgO S_2O_2. Atomic weight, 164.

This salt is fully described in Part 1. page 264. For the properties of the soluble double salt of Hyposulphite of Silver and Hyposulphite of Soda, see page 193.

SULPHURETTED HYDROGEN. *See* HYDROSULPHURIC ACID.

SULPHURIC ACID.

Symbol, SO_3. Atomic weight, 40

Sulphuric Acid may be formed by oxidizing Sulphur with boiling Nitric Acid; but this plan would be too expensive to be adopted on a large scale. The commercial process for the manufacture of sulphuric Acid is exceedingly ingenious and beautiful, but it involves reactions which are somewhat complicated, and do not admit of a superficial explanation. The Sulphur is first burnt into gaseous Sulphurous Acid (SO_2), and then by the agency of Binoxide of Nitrogen gas, an additional atom of Oxygen is imparted from the atmosphere, so as to convert the SO_2 into SO_3, or Sulphuric Acid.

Properties.—Anhydrous Sulphuric Acid is a white crystalline solid. The strongest liquid acid always contains one atom of water, which is closely associated with it, and cannot be driven off by the application of heat,

This *mono-hydrated* Sulphuric Acid, represented by the formula HO SO_3, is a dense fluid, having a specific gravity of 1·845; boils at 620°, and distils without decomposition. It is not volatile at common temperatures, and therefore does not *fume* in the same manner as Nitric or Hydrochloric Acid. The concentrated acid may be cooled down even to zero without solidifying; but a weaker compound, containing twice the quantity of water, and termed *glacial* Sulphuric Acid, crystallizes at 40° Fahr. Sulphuric Acid is intensely acid and caustic, but it does not destroy the skin or dissolve metals so readily as Nitric Acid (see page 175), It has an energetic attraction for water (page 201), and when the two are mixed, condensation ensues, and much heat is evolved; four parts of acid and one of water produce a temperature equal to that of boiling water. Mixed with aqueous Nitric Acid, it forms the compound known as Nitro-Sulphuric Acid.

Sulphuric Acid possesses intense chemical powers, and displaces the greater number of ordinary acids from their salts (page 13). It *chars* organic substances, by removing the elements of water, and converts Alcohol into Ether in a similar manner. The *strength* of a given sample of Sulphuric Acid may generally be calculated from its specific gravity, and a Table is given by Dr Ure for that purpose. (see Appendix)

Impurities of Commercial Sulphuric Acid.—The liquid acid sold as *Oil of Vitriol* is tolerably constant in composition, and seems to be as well adapted for Photographic use as the *pure* Sulphuric Acid, which is far more expensive. The specific gravity should be about 1·836 at 60°. If a drop, evaporated upon Platinum foil, gives a fixed residue, probably Bisulphate of Potash is present. A milkiness, on dilution, indicates Sulphate of Lead. (See page 296.)

Test for Sulphuric Acid either free or in combination with bases.—If the presence of Sulphuric Acid, or soluble Sulphate, is suspected in any liquid, it is tested for by adding a few drops of a dilute solution of Chloride of Barium, or Nitrate of Baryta. A white precipitate *insoluble in Nitric Acid*, indicates Sulphuric Acid. If the liquid to be tested is very acid, from Nitric or Hydrochloric Acid, it must be largely diluted before testing, or a crystalline precipitate will form, caused by the sparing solubility of the chloride of Barium itself in acid solutions.

SULPHUROUS ACID.

Symbol, SO_2. Atomic weight, 32.

This is a gaseous compound, formed by burning Sulphur in atmospheric air or Oxygen gas; also by heating Oil of Vitriol in contact with metallic Copper, or with Charcoal.

When an acid of any kind is added to Hyposulphite of Soda, Sulphurous Acid is formed as a product of the decomposition of Hyposulphurous Acid, but it afterwards disappears from the liquid by a secondary reaction, resulting in the production of Trithionate and Tetrathionate of Soda. (See page 264.)

Properties—Sulphurous Acid, possesses a peculiar and suffocating odour, familiar to all in the fumes of burning Sulphur. It is a feeble acid, and escapes with effervescence, like Carbonic Acid when its salts are treated with Oil of Vitriol. It is soluble in water.

TETRATHIONIC ACID.

Symbol, S_4O_5. Atomic weight, 104.

The chemistry of the Polythionic Acids and their salts will be found carefully described in the first part of this Work, page 264.

WATER.

Symbol, HO. Atomic weight, 9.

Water is an Oxide of Hydrogen, containing single atoms of each of the gases.

Distilled water is water which has been vaporized and again condensed; by this means it is freed from earthly and saline impurities, which are not volatile, and hence remain behind in the body of the retort. *Pure* distilled water leaves no residue on evaporation, and should remain perfectly clear on the addition of Nitrite of Silver, *even when exposed to the light*; also it should be neutral to test paper.

The condensed water of steam-boilers sold as distilled water is apt to be contaminated with oily and empyreumatic matter, which discolors Nitrate of Silver, and is therefore injurious.

Rain water having undergone a natural process of distillation is fee from inorganic salts, but it usually contains a minute portion of *Ammonia*, which gives it an alkaline reaction to test-paper. It is very good for photographic purposes if collected in clean vessels, but when taken from a common rain-water tank should always be tested, and if much organic matter is present, tinging it of a brown color and imparting an unpleasant smell, it must be rejected.

Spring or river water, commonly known as "hard water," usually contains Sulphate of Lime, and Carbonate of Lime dissolved in Carbonic Acid, also Chloride of Sodium in greater or less quantity. On boiling the water, the Carbonic Acid gas is evolved, and the greater part of the Carbonate of Lime (if any is present) deposits, forming an earthy incrustation on the boiler.

In testing water for Sulphates and Chlorides, acidify a portion with a few drops of *pure* Nitric Acid, free from Chlorine (if this is not at hand, use pure Acetic Acid); then divide it into two parts, and add to the first a *dilute* solution of Chloride of Barium, and to the second Nitrate of Silver,—a milkiness indicates the presence of Sulphates in the first case or of Chlorides in the second. The *Photographic Nitrate Bath* cannot be used as a test, since the Iodide of Silver it contains is precipitated on dilution, giving a milkiness which might be mistaken for Chloride of Silver.

Common hard water can be used for making a Nitrate Bath when nothing better is at hand. The chlorides it contains are precipitated by the Nitrate of Silver, leaving soluble *Nitrates* in solution, which are not injurious. The Carbonate of Lime, if any is present, neutralizes free nitric Acid, rendering the Bath alkaline in the same manner as Carbonate of Soda.

Hard water however is not usually sufficiently pure for the developing fluids. The Chloride of Sodium it contains decomposes the Nitrate of silver upon the film, and the image cannot be brought out perfectly. The *New River water*, however, supplied to many parts of London, is almost free from Chlorides, and answers very well. In other cases a few drops of Nitrate of Silver solution may be added to seperate the Chlorine, taking care not to use a large excess.

APPENDIX.

QUANTITATIVE TESTING OF SOLUTIONS OF NITRATE OF SILVER.

The amount of Nitrate of Silver contained in solutions of that salt may be estimated with sufficient delicacy for ordinary Photographic operations by the following simple process.

Take the *pure* crystallized Chloride of Sodium, and either dry it strongly or fuse it at a moderate heat, in order to drive off any water which may be retained between interstices of the crystals; then dissolve in distilled water, in the proportion of $8\frac{1}{2}$ grains to 6 fluid ounces.

In this way, a standard solution of salt is formed, each drachm of which (containing slightly more than one-sixth of a grain of salt) will precipitate exactly half a grain of Nitrate of Silver.

In order to use it, measure out exactly one drachm of the Bath in a minim measure and place it in a two-ounce stoppered phial, taking care to rinse out the measure with a drachm of distilled water, which is to be added to the former; then pour in the salt solution, in the proportion of a drachm for every 4 grains of Nitrate *known to be present* in an ounce of the Bath which is to be tested; shake the contents of the bottle briskly, until the white curds are perfectly separated, and the supernatant liquid is clear and colorless; then add fresh portions of the standard solution, by 30 minims at a time, with constant shaking. When the last addition causes no *milkiness*, read off the total number of drachms employed (the last half-drachm being subtracted), and multiply that number by 4 for the weight in grains of the Nitrate of Silver present in an ounce of the Bath.

In this manner the strength of the Bath is indicated within two grains to the ounce, or even to a single grain if the last additions of standard salt-solution be made in proportion of 15, instead of 30 minims.

Supposing the Bath to be tested is thought to contain about 35 grains of Nitrate to the ounce, it will be convenient to begin by adding to the measured drachm, 7 *drachms* of the standard solution; afterwards, as the milkiness and precipitation become less marked, the process must be carried on more cautiously, and the bottle shaken violently for several minutes, in order to obtain a clear solution. A few drops of Nitric Acid added to the Nitrate of Silver facilitate the decomposition of the Chloride; but care must be taken that the sample of Nitric Acid employed is pure and free from chlorine, the presence of which would cause an error.

RECOVERY OF SILVER FROM WASTE SOLUTIONS,—FROM THE BLACK DEPOSIT OF HYPO-BATHS, ECT.

The manner of separating metallic Silver from waste solutions varies according to the presence or absence of alkaline Hyposulphites and Cyanides.

a. *Separation of metallic Silver from old Nitrate Baths.*—The Silver contained in solutions of the Nitrate, Acetate. ect., may easily be precipitated by suspending a strip of sheet Copper in the liquid; the action is completed in two or three days, the whole of the Nitric Acid and Oxygen passing to the Copper, and forming a blue solution of the Nitrate of Copper. The metallic Silver however separated in this manner, alway contains a portion of Copper, and gives a blue solution when dissolved in Nitric Acid.

A better process is to commence by precipitating the Silver entirely in the form of *Chloride of Silver*, by adding common Salt until no further milkiness can be produced. If the liquid is well stirred, the Chloride of Silver sinks to the bottom, and may be washed by repeatedly filling the vessel with common water, and pouring off the upper clear portion when the clots have again settled down. The Chloride of Silver thus formed may afterwards be reduced to metallic Silver by a process which will presently be described.

b. *Separation of Silver from solutions containing alkaline Hyposulphites, Cyanides, or Iodide.*—In this case the Silver cannot be precipitated by adding Chloride of Sodium, since the Chloride of Silver is *soluble* in such liquids. Therefore it is necessary to use the Sulphuretted Hydrogen, or the Hydrosulphate of Ammonia, and to seperate the Silver in the form of *sulphuret.*

Sulphuretted Hydrogen gas is readily prepared, by fitting a cork and flexible tubing to the neck of a pint bottle, and having introduced *Sulphuret of Iron* (sold by operative chemists for the purpose), about as much as will stand in the palm of the hand, pouring upon it 1½ fluid ounce of Oil of Vitriol diluted with 10 ounces of water. The gas is generated gradually without the application of heat, and must be allowed to bubbel up through the liquid from which the Silver is to be seperated. The smell of Sulphuretted Hydrogen being offensive, and highly poisonous if inhaled in a concentrated form, the operation must be carried on in the open air, or in a place where the fumes may escape without doing injury.

When the liquid begins to acquire a strong and persistent odour of Sulphuretted Hydrogen, the precipitation of Sulphuret is completed. The black mass must then be collected upon a filter, and washed by pouring water over it, until the liquid which runs through gives little or no precipitate with a drop of Nitrate of Silver.

Mr. Maxwell Lyte has lately communicated a process for separating the Silver from Hypo-Baths, which is as follows:—He renders the liquid strongly alkaline with Caustic Potash and *boils* it; the Hyposulphite of Silver then splits up into Sulpnuret of Silver and Sulphuric Acid (p. 122), the latter of which unites with the alkali, forming Sulphate of Potash. A little Grape Sugar added at the same time with the Potash is said to facilitate the decomposition.

Conversion of Sulphuret of Silver into metallic Silver.—The black Sulphuret of Silver may be reduced to the state of metal by roasting and subsequent fusion with Carbonate of Soda; but it is more convenient, in operating on a small scale, to proceed in the following manner:—first convert the Sulphuret into Nitrate of Silver, by boiling with Nitric Acid diluted with two parts of water; when all evolution of red fumes has ceased, the liquid may be diluted, allowed to cool, and filtered from the insoluble portion, which consists principally of Sulphur; but also contains a mixture of Chloride and Sulphuret of Silver, unless the Nitric Acid employed was free from chlorine; this precipitate may be heated in order to volatillize the Sulphur, and then digested with Hyposulphite of Soda, or added to the Hypo-Bath.

The solution of Nitrate of Silver obtained by dissolving Sulphuret of Silver, is always strongly acid with Nitric Acid, and also contains *sulphate* of Silver. It may be crystallized by evaporation; but unless the quantity of material operated on is large, it will be better to precipitate the Silver in the form of Chloride, by adding common Salt, as already recommended.

REDUCTION OF CHLORIDE OF SILVER TO THE METALLIC STATE.

The Chloride of Silver is first to be carefully washed, by filling up the vessel which contains it, many times with water, and pouring off the liquid, or drawing it off close with a siphon. It may then be dried at a gentle heat, and fused with twice its weight of dry Carbonates of Potash, or, better still, with a mixture of the Carbonates of Potash and Soda.

The process for reducing Chloride of Silver in the moist way, by metallic Zinc and Sulpuric Acid, is more economical and less troublesome than that just given; it is conducted as follows:—The Chloride, after having been well washed as before, is poured out into a large flat dish, and a bar of metallic Zinc placed in contact with it. A small quantity of Oil of Vitriol, diluted with four parts of water, is then added, until a slight effervscence of Hydrogen gas is seen to take place. The vessel is set aside for two or three days, and is not to be disturbed, either by stirring or by moving the bar. The reduction begins with the Chloride immediately it contact with the Zinc, and radiates in all directions. When the whole mass has become of a grey color, the bar is to be carefully removed and the adhering Silver washed off with a stream of water; the Zinc usually presents a honeycombed appearance, with irregularities upon the surface, which however are not metallic Silver;—they consist only of Zinc or of Oxidide of Zinc.

In order to ensure the purity of the Silver, a fresh addition of Sulphuric Acid must be made, after the Zinc bar has been removed, and the digestion continued for several hours, in order to dissolve any fragments of metallic Zinc which may have been inadvertently detached. The grey powder must by washed repeatedly with water, both cold and hot, untill the liquid which runs off gives no precipitate with Carbonate of Soda; it may then be converted into Nitrate of Silver by boiling with Nitric Acid diluted with two parts of water.

Mr. Pollock has observed that in reducing Chloride of Silver precipitated from old Nitrate Baths *Containing Iodide of Silver*, the grey metallic powder is invariably contaminated with unreduced Iodide of Silver, which afterwards dissolves in the solution of Nitrate of Silver formed on treating the mass with Nitric Acid. To avoid this wash the purified Silver with solution of Hyposulphite of soda, and then again with water.

MODE OF TAKING THE SPECIFIC GRAVITY OF LIQUIDS.

Instruments are sold, termed "Hydrometers," which indicate specific gravity by the extent to which a glass bulb containing air, and properly balanced, rises or sinks in the liquid; but a more exact process, and one equally simple, is by the use of the specific gravity bottle.

These bottles are made to contain exactly 1000 grains of distilled water, and with each is sold *a brass weight,* which counterbalances it when filled with pure water.

In taking the specific gravity of a liquid, fill the bottle quite full and insert the stopper, which being pierced through by a fine capillary tube allows the excess to escape. Then having wiped the bottle quite dry, place it in the scale-pan, and ascertain the number of grains required to produce equilibrium; this number added to, or subtracted from, *unity* (the assumed specific gravity of water), will give the density of the liquid.

Thus, to take examples, supposing the bottle filled with *rectified Ether* to require 250 grains to enable it to counterbalance the brass wesght,—then 1· *minus* ·250, or ·750, is the specific gravity; but in the case of *Oil of Vitriol* the bottle when full will be *heavier* than the counterpoise by, perhaps, 836 grains; therefore 1· *plus* ·836, *id est* 1·836, is the density of the sample examined.

Sometimes the bottle is made to hold only 500 grains of distilled water in place of 1000; in this case the number of grains to be added or subtracted must be multiplied by 2.

In taking specific gravities observe that the temperature be within a few degrees of 60° Fahrenheit (if higher or lower immerse the bottle in warm or cold water); and wash out the bottle thoroughly with water each time after use.

ON FILTRATION AND WASHING PRECIPITATES.

In preparing filters, cut the paper into squares of a sufficient size, and fold each square neatly upon itself, first into a half-square, and then again, at right angles, into a quarter-square;—round off the corners with a pair of scissors, and open out the filter into a conical form, when it will be found to drop exactly into the funnel and to be uniformly supported throughout.

Before pouring in the liquid, always moisten the filter with distilled water, in order to expand the fibres; if this precaution be neglected, the pours are apt to become choked in filtering liquids which contain finely divided matter in suspension. The solution to be filtered may be poured gently down a glass rod, held in the left hand, (*a silver spoon* may be used, in case of necessity, for Nitrate Baths, and all liquids not containing Nitric or Hydrochloric Acid,) and directed against the side of the funnel, near to the upper part. If it does not immediately run clear, it will usually do so returning it into the filter and allowing it to pass through a second time.

Mode of Washing Precipitates.—Collect the precipitate upon

and the washing continued until no impurity can be detected. Thus, for example, in washing the Sulphuret of Silver precipitated from a Hypo-Bath by means of Hydrosulphate of Ammonia, the process will be completed when the water which runs through causes no deposit with a drop of Nitrate of Silver solution.

ON THE USE OF TEST-PAPERS.

The nature of the coloring matter which is employed in the preparation of Litmus-paper has already been described at page 40.

In testing for the alkalies and basic oxides generally, the blue litmus-paper which has been reddened by an acid may be used, or in place of it, the *turmeric* paper. Turmeric is a yellow vegetable substance which posseses the property of becoming brown when treated with an alkali; it is however less sensitive than the reddened litmus, and is scarcely effected by the weaker bases, such as Oxide of Silver.

In using test-papers observe the following precaution:—they should be kept in a dark place, and protected from the action of the air, or they soon become purple from Carbonic Acid, always present in the atmosphere in small quantity. By immersion in water containing about one drop of Liquid Potassæ in four ounces, the blue color is restored.

Test-papers prepared with *porous* paper show the red color better than those upon glazed or strongly sized paper. If the quantity of acid present is small, is it not sufficient in any case simply to dip the paper in the liquid ; a small strip should be thrown in, and allowed to remain for ten minutes or a quarter of an hour

If the paper, on immersion, assumes a *wine-red* or purple tint, in place of a decided red, it is proably caused by Carbonic Acid gas; in that case the blue color returns when the paper is washed and held to the fire.

Blue litmus-papers may be changed to the red papers used for alklies by soaking in water acidified with Sulphuric Acid, one drop to a half a pint; or by holding for an instant near the mouth of a bottle containing glacial Acetic Acid.

From the Jour. of the Phot. Soc.

COLLODION ON A JOURNEY.

To the Editor of the Photographic Journal.

Sir.—Having lately returned from a successful photographic excursion through France, I shall be most happy to describe my *modus operandi* should you think it worthy of a place in your valuable Journal, being different from any other I have hitherto seen. The collodion negatives, to my way of thinking, have several advantages over the paper, inasmuch as you can make sure of the view being good before leaving the spot, which in the calotype or waxed paper you cannot ascertain till you have returned home; moreover, the paper is so very slow when compared with collodion, that still life cannot be well introduced. Some of our friends in the paper process say that they have now brought it to such a degree of perfection as to make failures almost impossible, but every person has not the time for practicing, experimenting, &c., that these gentlemen have, and consequently the results they get are not satisfactory. The only thing that remains, then, is to either take a tent to prepare the plate in the open air, or to purchase a camera wherein to do all the processes, for instance Mr. Archer's. These two appear to me to be the only likely ways, and both of them have disadvantages. The usual form of tent being so cumbersome for one person to carry any distance (I mean of course when taking the camera

a filter and drain off as much of the mother-liquid as possible; then pour in distilled water by small portions at a time, allowing each to percolate through the deposit before adding a fresh quantity. When the water passes through perfectly pure, the washing is complete; in testing it a single drop may be laid upon a strip of glass and allowed to evaporate spontaneously in a warm place, or the proper chemical reagents may be applied,

and all other necessary appendages), Mr. Archer's camera certainly to my mind appears much more advantageous; but there is one objection even then that would deter many persons like myself from buying one, namely the price. What is wanted then is a tent that will combine portability with usefulness, and the camera, chemicals, table and seat made in such a manner, as when put up together not to exceed a weight that one person can easily carry. I have been about fifteen hundred miles, crossed the English Channel, and had it opened four or five times by the *octroi* or custom-house officers, carried it miles taking views, and returned home highly delighted with each day's amusement.

I purchased a rather large but ordinary camera-stand, composed of three legs, about one yard and a half in length, fastened together at the top by a sort of brass wheel, with a screw in the centre to fasten the camera on with. These stands are to be had at any photographic warehouse (a tall person would require one perhaps rather larger, but the size I have given is for a person about 5 feet). This stand when put up together, forms the frame-work of the tent, and answers equally well to put the camera on when taking the view. All that is required now to make your tent and camera-stand perfect, is the covering of calico; I found two thicknesses quite sufficient, one black and another yellow, both of them rather stout; these were cut in a sort of sugar-loaf fashion and stitched together, letting the widest part fall to the bottom, also putting in a thick, round, double piece at the top, the same size as the brass ring, and leaving a small hole in it for the screw to come through so as to fasten the camera on. Have the covering made large, so as to lap well over where the door is formed, and also to come a tolerable distance on the ground, to ensure total exclusion of white light: a little piece of black calico cut away from the side, and two or three extra pieces of yellow inserted, will give plenty of light for manipulating. This then does away with the extra framework of a tent and answers equally well. I will now, Sir, with your permission, describe, in as brief a manner as possible, the only remaining two things—the box and the camera, both of which are very simple; the former is about 16 inches in depth, 9 in width, 12 in breadth, and about ½ an inch in thickness, made just large enough to admit the camera. Of course the box and latter can be made to any requisite size, but if made much larger would, I think, be rather too cumbersome. The camera—only a very light, *common* sliding, not folding one—when drawn out to its full extent, is quite large enough to hold everything requisite for taking a large quantity of half-plate collodion pictures. The box answers two purposes; first as a table and seat, and then to put the camera in; containing lens, water-tight gutta-percha baths (one with the nitrate, and another with a very small portion of salt dissolved in common water which serves for fixing), and two gutta-percha bottles, one with collodion, and another with developer; a plate box containing about one dozen plates, and several more wrapped up in your wash-leather. When going any distance, it is well to take several small packets of pyro-gallic acid, each containing about 5 grains; also another bottle with acetic acid, so as when arrived at your destination, to mix with common water; also a one-ounce glass measure for pouring the developer into, and a gutta-percha tray for holding the plate over when undergoing the same operation. All these things will easily go into the camera, and not be so heavy as one might imagine. The box when laid on the ground sideways forms a seat, and the lid, when supported by a piece of wood (fastened underneath), serves for a table. In travelling, wrap the tent-covering round the stand, which can be easily carried in one hand, and the box containing all the other necessary appendages in the other; it can be put up, the glass prepared, the view taken and fixed in less than ten minutes.

Trusting that the above remarks may prove useful to many who are about taking collodion views, I remain, yours truly,

J. Edwin Izard.

— Good nature is the very air of a great mind, the sign of a large and generous soul, and the peculiar soil on which virtue prospers.

From the London Art-Journal.

A FEW WORDS ON BEAUTY.

Present—Magister *and* Amicus.

Amicus.—Beauty, you say, is the legitimate subject for Art—would you, then, limit Art to the expression of the agreeable only? Would it not thus be deprived of many fine subjects, and often of the opportunity of inculcating a moral lesson?

Magister.—At least the more beauty there is in a subject, the more it is suitable for Art. Subjects incapable of beauty are unfitted for representation.

Amicus.—To take a favourable subject with the painters of of the middle ages—"The Fall of the Wicked"—

"hurled,
With hideous ruin and combustion, down
To bottomless perdition,"

how would you rank this subject?

Magister.—Pictures of pure horror are certainly not suited to our tastes at present. The "Murder of the Innocents" appears to me the most detestable subject of mediæval art, more especially as frequently represented in the most actual manner. The subject you instanced is more mythic; mysterious and removed from actual life, and thus less atrociously abhorrent. Its nature is more epic—and when presented to us as it has been by Michael Angelo and Rubens, it posesses so much beauty of composition, form and colour, that it may be said to be dragged into the category of the beautiful.

Amicus.—But what is the principal impression derived from it? Is it that of beauty?

Magister.—Perhaps not. But each work of Art may be said to be two-fold in its nature. In the first place there is the subject—the story told—the mental aim. In the case you mentioned there is the "doom of evil" presented—a moral lesson. This may be called its theoretic quality, which speaks straight to the intellect. Secondly, there is that which addresses itself more sensually—that is—enlists in its favour those messenger senses of sight which convey it to the mind, and speaks to their predilections for graceful flowing compositions, and the charms of line, tone, and colour.

Amicus.—May you not add a third quality as intermediate, so to speak, existing between and uniting these—viz., that represented by the ingenuities of the modes selected by the artist in adapting the subject to the powers and expression of his art, such as groups, actions, episodes, chosen by him, that speak, not by words, but by visible images? Thus, firstly we should have the mental story to be told; secondly, the artistic view of the subject that has adapted it to the arts of visible expression; and thirdly, the modes and felicities of execution, by which all this has been carried out.

Magister.—I was going to say that beauty in execution would go far towards rendering the subject suitable for Art; but I readily accept your third division, and, appropos of it, would add that there is nothing in which the capacity of an artist is more shown than in the mode by which he adjusts a given subject to the powers of his own art. Thus you have set the proposition on a Delphic tripod.

Amicus.—Truly a three-legged stool will adapt itself to any uncertainties of ground, and the reason, perhaps, that ancient priestcraft adopted it. So ours, perhaps, may stand, until some one seeks to add a fourth or fifth leg to our definition:—for in these kinds of disquisitions the last speaker is uppermost, like the childs game of "hand over hand," and the edifice that looks very stable for the moment requires but a stone loose for it to be easily pulled down into ruins by another spectator, to form materials for a fresh structure, possibly equally short-lived.

Magister.—But such disquisitions may be occasionally useful not only as gymanastics for the mind—to exercise its powers, and make firm its muscles, but particularly as regards the aims and means of art.

Amicus.—No doubt;—and if conducted in a proper spirit, they also read us a good lesson, by illustrating the bounds, beyond which we cannot soar. I recollect an account of some pigeons which were taken up by an æronaut and let out when his balloon was at its highest. The poor things seemed quite lost. They waved their wings very vigorously, but the air was to thin for them, and it was with much difficulty that they got back to the car from which they started. Thus it is, not unfrequently with your metaphysical gentlemen. From the very high starting point they take, they get at once into an ether too subtile for their pinions, and they flap round and round without making any progress. Doubtless, your metaphysical requires a still stronger curb than even your poetical Pegasus.

Magister.—As simile second, such a would-be grasper at the "nature of things" may be likened to an insect, which, having always lived on one leaf, would fain reason proudly on the whole tree, or the wood in which it stands.

Amicus.—There are no doubt very high things which can be and have been, truly, as far as we can judge, compassed and expressed by mathematic rules. For example,—what can be more lofty or enobling than the knowledge—to which science and the successively piled labours of great minds have enabled us to creep —of the times, orbits, sizes, and the distance of the heavenly bodies. But as to the "essential nature of things," we do not seem much farther advanced than at the time of the wise men of Greece.

Magister.—For instance, we were speaking of Beauty in regard to works of Art. Beauty is always attractive, in what ever way it be manifested. It is an object of our involuntary as well as voluntary regard; and yet we can't define it, I fully believe, except in a general way. It is a part of the "*to kalon*" that baffled the ancient philosophers.

Amicus.—Yes!—the search after such abstractions reminds me of the pursuit which they say Swedenborg used to make about his room, with two hair-brushes, after the spirits which he deemed were ever hovering around him! We cannot catch an abstract essence as an etomologist does a beetle or a butterfly, and pin it down and look at it through a microscope!—Some Persian poet calls Beauty the perfume of the soul, and there it must rest.

Magister.—Some have thought to define it as the result of the union of fitness and proportion; but, as regards form, comparative anatomy alone were perhaps sufficient to show the inadequacy of such a definition. Have you paid any attention to the last subject?

Amicus.—A little—that is—as regards general principles.

Magister.—You know one of these is, that there is a general connection and unity of plan in all animal bodies, which is especially evident in the higher and more developed classes. Especially as regards what our friend the professor would call the "osseus structure;" and that if you set up the skeleton of a horse or a lion on his hind feet beside that of a man, you find nearly all the details of the beast identical with that of the man, as the hock with the heel, the stifle joint with the knee, and the knee with the wrist, &c.

Amicus.—Yes, I recollect attending a lecture of Mr. Haydon, in which these resemblances were clearly pointed out.

Magister.—And this does not stop with the quadrupeds, but ascends to the birds, in which the wing represents the arm, and nearly all the muscles of the part of the body to which it is attached are devoted to moving it. Now, an angel has ever been considered a beautiful object in Art. The Egyptian, Hebrew, Assyrian, Phœnccian, Greek, Roman, and in the latter days, our most tasteful artists such as Raphael and Flaxman, have delighted to represent such beings. But how is the human structure to receive and accomodate arms and wings both, which are representatives of each other? Where is the room for their attachment, and for that of the muscles to move them? And could they be so attached, would not they be very much in each other's way? So much for the fitness of an object of Art which has universally been acknowledged to be beautiful. Again, I think Pliny affords an account of a Greek picture, very celebrated and much admired, of a family circle of Centaurs, father and mother, all at home with their little foals, and yet these represented creatures with two sets of internal vital organs.

Amicus.—To accomodate which they may have dined alter-

nately of roast meat and oats. May be, on the occasion when they met the Lapithæ, at the marriage of Hippodamia, they had lunched previously with the steeds in the stable before completing their repast with their masters upstairs; and this disagreement of words, in accordance with what some one has said as to all great dissensions being traceable to errors of digestion, may have had some part in the notable row that was got up on that occasion.

Magister.—Which afforded such a favourite subject to the artists of old. However after all that may be said in the way of ridiculing too keen a search after precise definition, some advantages are derived from their discussions. Many a useful discovery emanated originally from astrology and the search after the philosophers stone; and fitness though useless as a definition, may be, and is doubtless excellent as a quality in a work of art.

Amicus.—Especially if we give it the less pedantic name of common sense, although indeed it might be rather difficult to argue all the fine things even into that category. Unless, indeed, common sense is to be taken with a dramatic or operatic interpretation, which allows a large licence; but even then I fear it were impossible. I am a great admirer of Milton. Trite enough! you will say; but perhaps not so much so, when I add that I am one of the very few who really have read *Paradise Lost* through, from beginning to end, every word. Moreover, I am ever reading it between whiles; but I must allow with Johnson, that I cannot away with the battle of the angels, or the gunpowder bombardment of heaven.

Magister.—Which, after all, was only a copy of Hesiod's War of the Giants and Titans.

Amicus.—That he copies too, if you recollect, seperately, in the second day of the fight; that is, the Pelion-upon-Ossa part of the affair. But, doubtless, the old poet had the best of it. There was at least a dramatic fitness in making volcanoes war with heaven and belch forth rocks and flames in the face of celestial spirits; but "villanous saltpetre" should not have been introduced into angelic fight, however much Milton may have desired to express his detestation of that agent of war. The whole struggle of spirit and matter in that great poem was an unexampled difficulty to treat; but, with this exception, the great poet throws his whole authority on the side of property. How fitting are all the mortal details which really could be grasped! How characterestic the representation of our first parents and the world of turbulent thoughts out of which his Satan is created! In all he could compass, every episode and thought and description was suitable for its purpose, and it was only in those parts of this subject that are beyond all mortal power that consistency is occasionlly left behind. Therefore, taken as a whole, his work adds strength to the authority for common sense in Art of the highest class.

Magister.—Those who have made fitness the father, have made proportion the mother of Beauty. But they would have to allow very protean qualities to that mother. For what two beautiful objects in nature present the same? Do the lily and the rose?— or the deer and the leopard?

Amicus.—But in the human race, do you or not think that Beauty, as far as form goes, can be brought down to any defined ratio?

Magister.—At least it would have to vary with age, sex, and character, and it would be quite vain in the practice of Art to attempt to apply one common ratio to the forms of men, women, and infancy, or to varieties of character. Nor do I think any practically useful, except a few general ones—such as those set forth by Da Vinci or Flaxman, not according to any abstract system, but from the measurements of fine nature and of the ancient statutes. Beyond this they trammel Art rather then assist her, and tend to produce what the French call *chic.*

Amicus.—Which is?

Magister.—A sort of conventionalism at variance with nature giving to works the appearance of having been done by receipt.

Amicus.—I have, nevertheless, seen some very elaborate and ingenious theories and diagrams applied to forms of recognised beauty, such as the Portland Vase, the Medicean Venus, and the Facade of the Parthenon; and there were really some remarkable results shown, certainly rather intricate and difficult to follow, but still fascinating, and having a show at least of reason. Would you regard all these labours as mere *nugæ difficiles,* and set them down as of no services whatever to Art?

Magister.—Not so—I consider Art and the professors of it much indebted to all persons who will carefully and heartily give their own views of it. It does good to Art agitating such questions, if only by bringing it before the public in various points of view; but even father than this I am by no means inclined to deny that a good thought, even as regards practical usefulness, may occasionally be struck out by such means. But as a system on which to rest or depend, I consider such geometric schemes of beauty as illusory. I have seen some of these theories to which you allude, and I especially remember one system of beauty founded upon the proportions of the Venus de Medicis, illustrated by a vast number of lines and proportions running hither and thither all over her like a web, proposing to illustrate the science on which she was formed, and to give the key to the reproduction of such beauty in Art generally. Now, even granting that she combines all that is most beautiful in female form (which I am heretic enough to be very far from), I do not believe she was either executed by such a process, or that the student would be advantaged by such, even in copying her. As to her original creation by such means, I believe her author, could he return to the world of Art, would be as much astounded by the theory attributed to him as Shakspeare would by many latent meanings fastened on him by his commentators. As far as Art is concerned, antiquity never walked up to her creations of beauty on the legs of a pair of compasses!

Amicus.—Sir Francis Bacon seems to have been of the same mind, when he says—"Though a painter may make better faces than ever was, that he must do it by a kind of felicity (as a musician that maketh an excellent air in musick) and not by rule: a man, " he adds "shall see faces, that if you examine them part by part, you shall find never a good, and yet all together do well.

Magister.—Exactly. That is, we are to look for Beauty more in the harmony of details than in the individual beauty of parts considered by themselves.

Amicus.—By which means she produces so much the more variety, inasmuch as the number of tunes in music exceed that of notes. For my part, I do not admire scholastic restrictions that prescribe certain regularities to Beauty, as such and such features and colours in every case. I believe in a *retroussee* nose as well as a Grecian one, and in red hair as well as black, or brown, or golden.

Magister.—With certain reservations of course. However, the great master of the "Novum Organum," in the words you have just repeated, illustrates my views on this subject pretty closely. I believe, indeed, that beauty in Art arises more from a certain inspiration of harmony than from any set or definable proportion of lines or features, and that in such creations as hers, form, colours, and arrangement come into the artists mind, like the verse and rhymes of the poet at one birth. In nature, to which every artist looks for precept and example, how thoroughly is this harmony borne witness to! How much, as a whole, is a plant in harmony with itself in its least details, even to its smallest anther or leaflet! Nature seems never to make a mistake. Each part belongs to the others, and to change one would be like striking a false note.

Amicus.—It has been said however, that the "Great Mother" works by mathematics.

Magister.—She may. We see she *does* in many respects, and the principle of all her manifestations may be guided by these in her inmost laboratory. But we began by agreeing that we could not arrive at the *essence* of things, and that they are only *effects* we are able to reach, even when we call them *causes.* If she creates beauties by mathematics, it is in a mode we do not understand, and surely if geometry takes such parts in our creations in art, it is in a latent way, as in the other provinces of nature,—the artists mind being but an unknown agent—as much a part of nature as any other. There are, however, doubtless, some departments of Art in which the direct use of the rule and

compass, and other mechanical aids are highly essential and useful but truly as a nurse, not a parent—as a staff, and not an index. Thus it is in architecture, and in all that extensive field of ornament which rightly belongs to its province, and wherein conventional forms and diapers, &c., are required in repitition for the decoration of surfaces. But as regards Art in general, the more intelligent, imaginative, and vital the subject, the less way on the road to it will mechanical aids accompany and assist the young aspirant. No Art can thorougly compreheud and take in but one phase of nature.

Amicus.—Except, perhaps, the dramatic, in which man himself, in his mind, persou, speach, and action, is his own brushes, paint, and canvas.

Magister.—But even that "mirror held up to nature" has but one side, and no representation requires a greater amount of allowances to be made than that of the Drama It may be wider in its range than other Arts, but the very condensation it requires is one cause of its necessary incompleteness. Its shortcomings may be different from those of other Arts, but they exist to an equal extent. But to return to the Arts of Painting and Sculpture. It were trite to repeat that each has, as it were, but one phase of nature for its province, in which we can work profitably only according to the lights that are given us, and not according to those we fancy for ourselves; and yet the artist has not a clear view of his occupation if he has not this truth before him. The creature cannot comprehend the Creator,or His mode of creation, and it is only here and there that we are permitted to peep through a gap, as it were, to see some of the principles of this wonderful machine. Nature is but one, and the whole theory of growth and existance may be pervaded and controlled by certain geometric and arithmetic proportions—as the great events and recurrences of Astronomy, but assuredly we cannot find them out. We certainly cannot find fixed ratios and regularities every where; on the contrary, irregularity (perhaps from our own limited powers) meets us on every side full as much as regularity. These two qualities, indeed, as far as we are able to see, are most intimately associated in nature's works—almost, one might say, in alternate stages. What regularity of structure, of fibres, and filaments, in a leaf or a flower—and yet what endless variety and irregularity exists in their distribution in a forest or a meadow! The general shape of the globe, a sphere modified by rotation, how exact its law of form—and yet how irregular the arrangement and indentation of the seas and continents, and fortuitous to our comprehension the directions of the great chains of mountains that streach across its surface. Pursuing this to a still wider range, how geometric are the motions of the planets which form our immediate system; and yet, how without the vestige of a regular plan that our comprehension can fathom lie in the depths of space the vast drifts of innumerable worlds that we perceive in the form of stars and nebulous masses. And "*parva componere magnis*," inasmuch as this analogy may bear upon Art, it illustrates that Beauty is not to be sought for wholly in regularity, but also in varid and subtile inspiration not to be bound by rule; and that she is not to be extracted, as some would have it, arithmetically, like a cube root! I believe that the triumphs of Art were never reached except with the assistance of a sort of "divine afflatus," which, however, never came but to the sincere, devoted, and ardent student. And that it was not till after their completion, and not in the process of their creation, that they were connected with any strict system of geometric proportion. They were done and admired, and it was not till afterwards, and when they had gained a steadfast nitche in the temple of Fame, that they were found to possess—if they do possess—one or more ratios of arithmetic proportion. But to the idea that they were originated by such means, beyond a few simple mechanical aids obeying, but not guiding the dictates of genius, I give no credence whatever.

Amicus.—I trust to your practical knowledge. But we have been talking of the planets: what think you of the "conic sections" in which they revolve, as exponents of lines of beauty? might they not be as illustrative as those chosen by Hogarth, or others?

Magister.—Something of this has been suggested—I think, at least, as regards eclipses—showing that most graceful forms arise from their combinations.

Amicus.—The parabolic curves are of most exquisite character,and the cone, cut spirally, also would afford, I can fancy, innumerable "lines of beauty."

Magister.—But these last would not be simple conic sections.

Amicus.—So much the better; you say we are not to put Beauty into too close trammels.

Magister—But the simple sections themselves, with their combinations, are doubtless capable of a vast variety, and I can well imagine an interesting comparison being made of the most remarkable coutours of beauty with those mysterious curves that guide the wonderous denizens of heaven,—that starry host—

"Ever singing as they shine,
The hand that made us is devine."

(*To be Continued.*)

From the Journal of the Photographic Society.

ALBUMENIZED PAPER.

To the Editor of the Photographic Journal.

8 Willow Cottages, Canonbury,
January 1, 1856.

Sir—On exposing sensitive albuminized paper to the light, it sometimes assumes a peculiar mottled appearance. I have had several inquiries lately as to the cause, and as it does not seem an unusual source of failure, perhaps you will allow me to explain it through the pages of the Journal.

In all cases the defect arises from an insufficient amount of silver having been supplied, to decompose the whole of the chloride and leave a portion of free nitrate on the surface of the paper. There are several ways in which this may happen.

The bath may have become too far weakened by use. The extent to which this takes place varies according to the quantity of chloride contained in the paper, but it always happens more or less often to an extent which would hardly have been supposed possible without a direct test.

The paper may have been left for too short a time in the bath. Generally the thick Canson's paper requires four or five minutes, whilst two or three will suffice for the thin. The thick paper is rather porous, and absorbs the albumen, and afterwards requires more time to allow the silver solution to penetrate than the thin or negative paper, which, being of a more compact texture, retains the albumen more on the surface. It does not answer well to sensitize with a glass rod or a brush. Such a plan might succeed when the albumen has been much diluted with water, but with the strongly albuminized paper it would be a constant cause of failure, unless the silver solution was extravagantly strong.

A very low temperature much retards the absorption of the silver. I was myself troubled from this cause during the recent cold weather. The paper was prepared before the room had become thoroughly warm, and dried at the fire. Almost every sheet bore traces of the mottled appearance. The remedy is obvious.

In sensitizing albuminized paper, a strength of about 60 gr's of nitrate of silver to the ounce of water will generally be found best. It should never be allowed to fall much below 40 grains, although I have occasionally found even less than 20 in the bath which I have been using, without noticing much ill effect. There is often a want of brilliancy and vigour in the finished proof when prepared in a weak bath; it is all half tone, even when the negative is a good one.

Whilst I am upon the subject of the strength of the silver bath, I may mention a very useful addition to any of the usual formulæ for testing which does not appear to be so well known as it deserves. It is simply to add a little bichromate of potash to the test solution of chloride. The exact quantity is not material: about 3 or 4 grains to 12 ounces will suffice. When this solution is added to the nitrate of silver to be tested, it produces a dark red colour, which completely disappears when sufficient has been gradually added to precipitate the whole of the silver. The use of the bichromate is to show with great accu-

racy and rapidity, by the change of colour, when this point is arrived at. It will answer equally well with any of the formulæ for testing which have already been given in the Journal—that in Vol. i. p. 173, for example. The amateur is, however, recommended to try his test solution on a silver bath of known strength, before depending upon it.

Albuminized paper has been somewhat depreciated of late. I think undeservedly so. It is said, that its brilliancy is vulgar; it may certainly be carried to an obtrusive extent, but I cannot think that a slight gloss, scarcely, or not at all exceeding that given by hot-pressing plain paper, is objectionable, and there can be no question that the minuter details are better copied, and the shadows more transparent, than by any other method. The photographer who cannot finish an albuminized proof without losing some of the lighter shades in the toning bath, or without bringing the lights to the exact colour of brimstone, must be a very clumsy operator. There is no difficulty whatever in preserving every shade of the lightest details, or in avoiding any trace of yellow in the light; although, to judge from the tint on which many lithographs are printed, this last is not considered very objectionable. Nor must it be overlooked, that mere artistic effect is often a very secondary consideration in a photograph. There is another, and sometimes much more important requisite, namely, the perfect clearness and legibility of every detail, whether in light or shadow; and here the albuminized paper is without a rival. Add to this the variety of excellent tints easily attainable, and the perminence which albumen, particularly with the help of gold, appears to give the proof, and, without wishing to unduly depreciate all other methods, some of which certainly have an advantage in particular circumstances, and for producing different effects, I think it will be admitted by most disinterested persons, that in the present state of our knowledge, the albuminized paper process is that best suited for general use.

W. Russell Sedgfield.

For the Photographic and Fine Art Journal.

MR. CHARLES POPE.

PHOTOGRAPHED BY J. H. FITZGIBBON OF ST. LOUIS, MO.

See Illustration.

The accompanying photograph conveys a very correct and expressive likeness of a gentleman, who, though but eight years on the stage and only 27 years old, has already attained an eminence in his profession rarely reached by actors in so short a period. Mr. Charles Pope, the subject of this notice, was born at Rochester in the State of New York, on the 7th of February, 1829, and when but eighteen years of age embraced the profession of which he is now a distinguished member. When only 12 years old on the occasion of witnessing the play of "The Stranger" in which Mr. Edwin Dean personated the Stranger and Mrs. M'Clure the character of Mrs. Haller, young Pope was captivated by the mimic scenes he saw represented, and determined from that time to seek fame and fortune upon the boards; and that determination was afterwards confirmed, when, on a second visit to the theatre not long afterwards, he saw and sympathized with Miss Julia Dean on her first appearance as Ellen, in the romantic drama of "The Lady of the Lake." After unsuccessful attempts to obtain an opportunity to make his *debut*, and after frequent visits to the theatre, where he witnessed and profitted by the classic and manly acting of A. A. Adams, Mr. Pope, at the age of eighteen, succeeded in entering the profession of his choice and in making his *debut* as Sir Richard Blunt in Richard III, a part that offered a very slender opportunity for the display of any professional ability, but which enabled our youthful aspirant for fame to gain an introduction to the art which he has since cultivated with signal success, and in which if we do not err, he will rise to a very elevated and enviable eminence.

Mr. Pope did not, as is now the fashion with novices in the profession, attempt the personation of characters which demand not only long and careful study, but a familiarity with the stage which nothing but practice and time can impart. He commenced with the rudiments. He made himself master of all the accomplishments requisite to the acquisition of grace and ease upon the stage; and he carefully studied the literature and the greatest masters of his art, and applied his mind to the deep study of the noblest creations of dramatic genius. He went through all the round of characters beginning with the most trivial, and continuing by perseverance and application to fit himself for the higher walks of the profession. The novitiate of his career was spent in New York, through the western towns of which he travelled with a strolling company, and continued to improve and feel at home in his profession. Later he appeared at Washington, and within a year from his entrance into the profession he had secured an engagement with Chippendale at the New York Opera House, and, subsequently, at the Broadway Theatre, where he acted for two seasons under the management of W. R. Blake. After this he appeared at the Bowery under Thomas Hamblin's management, and, subsequently, at the Broadway, invited thither by Mr. Barry, where he continued until engaged by Mr. De Bar for the St. Charles Theatre of New Orleans, where for two seasons he has played the leading business of that large establishment and acquired a solid and substantial fame with the refined and penetrating critics of the South. During the summer season of last year, while Mr. De Bar was lessee of the St. Louis theatre at St Louis, Mo., Mr. Pope was the leading actor of that establishment, and confirmed the favorable reputation that had preceded him to that city.

Mr. Pope has the advantage of nearly all his cotemporaries, in the possession of a fine manly figure, a fine expressive face, and a voice of great depth and richness of tone. These fit him perhaps more strikingly for serious acting than for comedy. His gestures are polished yet appropriate, and his style is quiet yet forcible, and is marked by vigor and power as well as repose, a combination of qualities which are exceedingly rare in any one actor, and particularly in one so young in years and in the profession as the subject of our remarks. Of late, the higher qualities of Mr. Pope, as an artist, have been fairly tested in the impersonation of the most difficult tragic characters of Shakspere, and he has won the most decided approval of the public in the South by the genius, skill and ability which he has displayed in their delineation.

Mr. Pope may now be said to have established himself and to be sure of his position as an artist of the first class. He has few equals in any of the regularly organized stock companies of the Union. We doubt whether he has many superiors amongst what are called "Stars;" and with a quick intellect, which he is continually exercising and cultivating, all the physical abilities requisite for a manly and commanding presence, and a determination, a perseverance and application, there is no reason why Mr. Pope should not stand in the course of a few years at the head of his profession.

NARATIVE OF A PHOTOGRAPHIC TRIP TO THE SEAT OF WAR IN THE CRIMEA.

BY ROGER FENTON, ESQ.

Permit me, before I commence the description of my labours in the Crimea, to thank you for the good wishes with which you accompanied me on my departure, and the kind welcome which I have received on my return. The knowledge that I was followed by the sympathy of the members of this Society, encouraged me often, when inclined to grow weary of my task, though I must also confess that it did not tend to tranquillize my nerves to think of the expectations which they might form as to the results of my labours.

I do not intend to-night to tell you merely about the modifications which were found to be necessary in our photographic work from the difference in climate, in intensity of light and elevation of temperature. These of course I shall have to speak of, with the hope that my experience, so laid before you, may call forth that of other members of the Society, some of whom

I know have practiced the art in countries where the themometer attains a higher point, and where the general character of the climate renders physical labour much more trying to the constitution than that of the Crimea.

I propose to give you a sketch of the preparations I made, of the difficulties I encountered, the way they were overcome, and of such incidents as struck me as most worthy of notice during my stay.

First, then, as to the preparations. I took with me a camera for portraits fitted with one of Ross's 3-inch lenses, two cameras made by Bourqnien, of Paris, of the bellows construction, and fitted with Ross's 4-inch landscape lenses, and two smaller cameras made by Horne, and fitted with their lenses, but in place of which I subsequently employed a pair of Ross's 3-inch lenses with which I had previously worked.

The stock of glass plates was, I think, 700, of three different sizes, fitted into grooved boxes, each of which contained about twenty-four plates; the boxes of glass were again packed in chests, so as to insure their secnrity.

Several chests of chemicals, a small still with stove, three or four printing frames, gutta percha baths and dishes, and a few earpenters tools, formed the prinepal part of the photographic-baggage.

I must not forget, however, what was to be the foundation of all my labours, the travelling dark room. The carriage, which has already had au existance chequered with many adventures by field aud flood, begau its career, so far as the present historian knows, in the service of a wine merchant at Canterbury.

When it entered into the service of Art, a fresh top was made for it, so as to convert it into a dark room; panes of yellow glass, with shutter, were fixed in the sides; a bed was constructed for it, which folded up in a very small space under the bench at the upper end; round the top were cisterns for distilled aud ordinary water, and a shelf for books. On the sides were places for fixing the gutta percha baths, glass-dippers, knives, forks, and spoons. The kettle and eups hung from the roof. On the floor, under the trough for receiving waste water, was a frame with holes, in which were fitted the heavier bottles. This frame had at night to be lifted up and placed on the working bench with the cameras, to make room for the bed, the furniture of which was, during the day, contained in the box under the driving seat. In the beginning of the autumn of last year, having hired in York a strong horse (but one, as we afterwards discovered, of neglected educatiou and of very irregular habits, which were displayed to the greatest extent, iu very strong relief, by my assistant, Mr. Sparling, who then made his first essay as a charioteer), we set forth on the road to Rivaulx Abbey in search of the picturesque.

From the experience obtained in this journey, which was very amusing, and not an unsuccessful one, several modifications were made in the construction of the carriage, aud it finally assumed the shape in which it appears in the photograph taken of it on the day ou which it traveled down the ravine called the Valley of the Shadow of Death: a picture due to the precaution of the driver on that day, who suggested that as there was a possibility of a stop being put in the same valley to the further travels of both the vehicle and its driver it would be showing a proper consideration for both to take a likeness of them before starting.

In addition to the purely photographic preparations were several boxes of preserved meats, wine and biscuits, harness for three horses, a tent, one of Price's candle-stoves, a few tools, and a great many other smaller matters, likely to be useful, the whole being packed in thirty-six large chests, which took up so much space on Blackwall Pier as to make me think with rueful forebodings of the sort of resting plaee they were likely to fiud on the shores of Balaklava.

The vessel in which, by the kiudness of the Duke of Newcastle and of Sir Morton Peto, my pasage was provided, staying two days at Giberalter, I took the opportunity of buying three horses at San Roque, where were collected a great number both of horses aud mules, for the purpose of sale to the British government.

Photographers, horses, and baggage, all arrived in due time safely at the entrance to the harbour of Balaklava, and after waiting for half a day outside in obedience to a signal saying that there was no room, the captain of the vessel got impatient, and the focus of his telescope happening to become deranged about the same time, he could no longer read the signal, and so steamed into the harbour, and through much bad language at last got elbowed into a birth near the head of the habour. Before this was accomplished, however, I went on shore, landing on a real stone jetty, and without getting knee-deep iu mud, though on either side of the newly made rough stone road there was plenty of evidence of what a filthy swamp the street must have been.

Strolling through the place to reconnoitre, I found plenty to look at. The emptying of Noah's ark could scarcely have been a stranger sight. Navvies aud Croats were working together on the railway, loading waggons, emptying ballast, exchanging "bouo Johnnies," and evidently the best friends. Leaving the town we passed or were met by a constant stream of costumes on foot, or mounted on every variety of quadruped. Zouaves were loitering about with baggy breeches, Turks with baggier. Making some inquiries of a soldier of the 17th Light Dragoons near Kadikoi, there came past some treop horses led or mounted: "There," said he, "is our regiment." I couuted them, thirteen in all. "You don't mean to say that these are all?" All that we can mount," he replied. These horses were a sad spectacle: rough, lanky, their heads down, their tails worn to the stump, most of them showing great patches of bare skin, they seemed too far gone to be able to recover.

Soon came by a drove of mules ridden or led by Turks, Arabs, Maltese, aud Blackies, and conducted by a Highland lad half drunk, mounted on a mule, with toes stuck out and month reaching from ear to ear. He grinned out in passing, "Here's the Royal Highland Brigade." Having delivered a few letters of introduction and obtained from Mr. Beattie engineer of the railway, permission to place my horses for a time in the railway stables, I returned to the ship, weary with excitement and with the anxiety which I felt as to how, in the midst of the chaos and confusion of Balaklava, I was to find any quiet spot in which to commence operations.

Looking back to these scenes, afterwards so fameliar as to excite no attention, I feel pleasure in remembering the oddness of the first sight of them, and hope that the Society will excuse me on this account for dwelling so long on what is not informatiou about photography.

That same night, pacing the deck, indulging in a quiet cigar, and calming down our excitement by the influence of the solemn starlight and the still water, the harbour so silent that it was difficult to realize the fact that 150 vessels and thousands of men were crowded into that narrow space, we new comers were startled by repeated flashes of red light over the hills towards Sebastopol, and the heavy boom of artillery. As it weut on at the rate of seventy shots per minute, nothing could persuade some of the party that it was not the grand attack, which we heard was just about to be made, and it was with difficulty they were dissuaded from setting off instantly, uight though it was, to be present at the grand finale.

Having got the horses ashore, the next thing was to disembark the van, an operation which at first appeared to be as impossible as that of squaring the circle. There were at that time but two spots where anything bulky could be put on shore,—a stone jetty of rough construction, called the cattle-pier, and a stage laid to the shore from the ship 'Mchawk,' from which railway waggons were being discharged. To get to these a considerable part of the harbour would have to be traversed, but first of all it was necessary to obtain the use of a boat large enough to contain the vehicle, and next to get the boat when obtained alougside our vessel. After hunting about for two days, from the admiral to the eaptain of the port and the eaptains secrataтry, and being sent by them with notes to the captains of Her Majesty's vessels in the harbour, receiving from every one kind atteution and promises of assistance, but finding always that the promised barge was loading with shells and would not be empty for two days, or that unluckily somebody else had just ta-

ken it without orders, or that the barge was there, but the men that belonged to it had just been ordered elsewhere, I saw that, if I could get none but official assistance, Sebastopol would be taken probably *vi et armis*, but not by photography.

In this dilemma the master of the transport 'Mohawk' came to my aid. He had offered previously the use of his ship's launch, but it was too small to contain the waggon. However, as there seemed no choice but either to fail, or to run the risk of its upsetting in the harbour, I accepted the offer. As the vessels in the harbour were packed side by side like herrings in a barrel, there was no possibility of getting the boat alongside. It was taken to the head of the vessel, and the van being slung over into it, the wheels resting on the edges, it began its dangerous voyage.

Safely landed at last, after many hair-breadth escapes, it obtained a temporary resting-place on the part of the shore where the railway establishment was being formed, and in order to avoid wasting time in answering questions, my assistant began work by painting the title "photographic van" on its exterior. A day or two afterwards, while developing one of my first negatives, a conversation went on outside, which I give as a specimen of many similar ones. "Eh, Jem; what's that?"—"P H O, pho-to graph."—"Is that anything to do with 'the line?'"—"No; they say there's a chap in there taking pictures."—"Is there?—then he shall take mine." There came a knock at the door, and without waiting for an answer, a pull to open it.

The door being locked, there was another knock and another speech. "Here, you fellow, open the door and take my picture!"

The door was opened to inform the visitor that his wish could not be gratified. "What did you come for if you're not going to take pictures? Come, I'll have mine done, cost what it may. What's to pay?"—"It can't be done, my man, pay or no pay." "Can't it, though! I'll go to Mr. Bettie and get an order for it."

I took a few pictures in this spot in order to enjoy the pleasure of making a beginning, though there was yet much to do before it would be possible to commence in earnest.

It was necessary first to obtain some place in which to store the numerous boxes of materials which were lying in the ship's hold. For this purpose nothing less than a hut would suffice, and to obtain one it was requisite to be provided with an order from head-quarters, and so I determined to ride up there and present a letter of introduction, with which by the kindness of His Royal Highness Prince Albert, I had been furnished, to the Commander-in-chief. But here an unexpected difficulty occurred. I had neglected to provide myself with saddle and bridle, thinking that as so many horses had perished, there must be saddles in plenty at Balaklava. It was a mistake: everybody was in want of either a horse or a saddle and bridle, and my horses had not been twenty-four hours in their stable before I received for them offers of more than twice their cost. The scarcity of horses procured at last the loan of what was needed. One of the railway-officers lent me a saddle, with one girth and a bridle, on condition of a mount on one of my horses. On the third horse a nautical friend shipped himself, making a sailors blanket do the duty of a saddle, and rigging up an extempore bridle.

Half a mile out of the town, in scrambling up a rocky ascent, my one girth broke, and saddle and rider went rolling down the hill-side, receiving serious damage in the descent. Proceeding on to the cavalry camp I was fortunate enough to meet with a good Samaritan, Quarter-Master of the 4th Light Dragoons, who lent me a good English saddle, and so enabled me to go on to head-quarters and apply for the wooden hut. After making the application, and finding that no answer could be returned that day, I rode on to the camp, though in considerable pain, in order to get a glimpse of the town, and to find out the quarters of General Barnard, to whom I had letters. He was sitting in his tent with a delightful prospect of a lunch on the table, at which he bade us to be seated—no unwilling guests.

As I was very anxious to become as soon as possible acquainted with the scenes which the camera was afterwards to depict, he kindly rode with us to some of the principal points from which the best views of the town were to be obtained, and afterwards invited me to come up at once to his quarters, and take a bed in one of his tents, an offer which it was perhaps fortunate I could not accept, since two days afterwards the bed was smashed by a round shot from the Russian batteries.

The General was going that afternoon with Sir R. England to the monastery, a distance of about six miles, and I did not like, when invited to be of the party, to loose the opportunity of seeing a spot so beautifully secluded, and so interesting from its classical site: though my aching ribs turned into painful pleasure what otherwise would have been a most delightful gallop over a fresh, breezy upland, intersected with sudden ravines, each with its little streamlet, and variegated with patches of brushwood and ridges of crumbling rock.

The next two days I was unable to move from pain, and had plenty of enforced leisure to think over all the precautions to ensure success that might have been adopted before leaving home.

When well enough to mount on horseback, I went up again to head-quarters, and obtained the order for the wooden hut; on presenting which at Balaklava to the proper official, I was told that the huts were all on board ship, but that if I would come again in about a week, there would be probably some on shore by that time. A week's, perhaps a fortnight's sun-light to be wasted! It was impossible to be satisfied with such an answer. I found at last that there were two huts on shore, appropriated, but not taken away from the store, and, after much trouble, got possession of one of them, and then went to Col Harding, the commandant at Balaklava, to ask for a site on which to erect it —a request which was instantly granted.

It took some trouble and time to transport this hut, plank by plank, from the other side of the harbour to its destination. The gang of Croats which Col. Harding had kindly furnished me with to level the ground, made themselves scarce the first time my back was turned, and never afterwards appeared, except doubtless on pay day, to receive their three shillings a-day. When the hut was up, and the heavy boxes transported safely to it, I was able to set to work seriously, and occupied myself for some time taking views in Balaklava and its neighbourhood, and in the cavalry camp beyond Kadikoi.

During this period till the beginning of spring, the light and temperature were everything that a photographer could desire. Without paying especial attention to the condition of the nitrate bath, I was able to take, with Ross's 3-inch double lens, with a diaphragm of about an inch and a half, almost instantaneous pictures. With the single lens, a Ross's 4-in., with an inch stop, from 10 to 20 seconds were sufficient. Towards the end of April, 3 seconds were frequently enough for the proper exposure of the negatives with the single lens; in some cases that was too much.

It is, however, with our present facilities, impossible to estimate the relative photographic value of solar light at different seasons, and in different countries, otherwise than approximatively. I am inclined to believe that the difference is much greater between the actinic power of light at different seasons in the same country, than it is in different countries in the same season. I have taken pictures in England in the spring, with a single lens, more rapidly than at any time in the Crimea. As the weather became hotter, and spring began to change into summer, the difficulty of getting successful pictures became in every way greater. First the actinic power of the light was less with the same collodion, and with the bath in apparently the same condition as in the spring, the time of exposure being gradually longer. As it got hotter still, it became very difficult to keep the nitrate bath in good working order. The consumption of nitrate of silver in making fresh baths was at this time very considerable.

As every photographer knows, a nitrate bath must be allowed to rest for some hours after any change has been made in its nature by the addition of either acid or alkali. These additions must also be so cautiously made, and with so many experiments, to see if the right point has been reached, that where time is an object, it is much better to make a new bath at once, and this we were generally obliged to do, and so the stock of nitrate fell short. This was one of the difficulties which I had foreseen no more than the trouble which the want of a saddle would occasion. It was more easy got over, for on application to the head of the

medical corps, I was supplied with a sufficient quantity of fused nitrate of silver to go on with.

It was difficult too, in the great heats, to clean the glass plate properly; perhaps I should rather say, that when the heat was intense, impurities upon the glass, which in a lower temperature would have been of no detriment, became centres of chemical action and caused spots or streaks in the negative picture.

It was necessary in the hot weather to thin the collodion to a much greater extent than is usual in England; and even with this precaution it was hard to spread a film of collodion evenly over a large plate, the upper part of the film drying before the excess of liquid had run off at the lower corner of the plate. From the same cause the development of the pictures was more difficult, as the film often became nearly dry in the short time necessary to take the slide containing it to the camera and back again, and then of course the developing fluid would not, when poured on the plate, run at once all over it without stoppage. Some idea of the heat may be formed from the fact, that the door of the van being one day in the beginning of June left open, and the sun shining into it, a gutta-percha funnel, which was exposed to its rays, became blistered all over, as if it had been laid upon the heated bars of a fireplace.

I need not speak of the physical exhaustion which I experienced in working in my van at this period. Though it was painted of a light colour externally, it grew so hot towards noon as to burn the hand when touched. As soon as the door was closed to commence the preparation of a plate, prespiration started from every pore; and the sense of relief was great when it was possible to open the door and breathe even the hot air outside.

I should not forget to state that it was at this time that the plague of flies commenced. Before preparing a plate, the first thing to be done was to battle with them for the possession of the place; the necessary buffeting with handkerchiefs and towels having taken place, and the intruders being expelled, the moment the last one was out, the door had to be rapidly closed for fear of a fresh invasion, and then some time to be allowed for the dust thus raised to settle, before coating a plate.

Eventually I was obliged, in the month of June, to cease working after 10 o'clock in the morning. Without reference to the fatigue which would have resulted from work during the heat of the day, it would have been impossible, so far as portraits were concerned, to take any satisfactory ones after that hour, for the glare was so great from the sky and burnt-up ground, that no one could keep his eyes more than half open.

On one occasion at this time, and only on one, an appointment was made with me for an hour that was earlier than I liked. I had requested General Pelissier to allow me to take his likeness, and told him at the same time that the earlier he could come the better. He promised to come the next morning at half-past four, and kept his appointment pretty punctually.

There was little lost at this time by ceasing to take views, except such as consisted principally of foreground; for the distant hills, which during the spring were always distinctly marked, and which shone in the greatest variety of rich and lovely colour, gradually merged in the hot weather into one indistinct leaden mass, mixed up confusedly with the seething vapoury sky.

Whatever is to be done by photography in these climates must be done either before the beginning of June or after the middle of September, both on account of the physical difficulties which the artist will have to encounter in the heat of summer, and also by reason of the inferiority of the pictures which nature presents to him at that season of the year.

This difference between the beauty of atmospheric effects at different seasons is very remarkably illustrated in skirting the coasts of the Mediterranean or sailing among the islands of the Ægean, where the objects that meet the eye, being all at a considerable distance, are at one season clear and distinct in outline, with infinite variety of form, and glowing in the richest colour; while in the heat of the summer the details are all drowned in one dull misty mass, the extreme distances are invisible, and the glorious colours are shrouded in a uniform neutral coat of grey.

I am forgetting, however, that my van is all this time at Balaklava, while I am rambling into the Mediterranean. I am afraid it must be left there for the present, for I have already occupied too much of your time. I must pass over the efforts which were made to break in my Spanish horses to running in harness, and how the attempt failed; and how I moved up to the front with six artillery horses, and pitched my tent at head-quarters, but finding it too small to hold all my family and stores, gave it up to Mr. Sparling, and had myself to be indebted for food and shelter to the hospitality of my friends,—now living in luxury and abundance, and now in want; occasionally sleeping in a general's marquee, and sometimes on the bare ground.

At the end of May feeling my health somewhat impaired, I obtained leave to join the Kertch expedition, but returned to the camp in time to witness the attack on the Mamelon by the French, and the Quarries by our own troops. On the day of that battle,—having taken the portrait of General Pelissier, as already mentioned, at a very early hour, and the group of the three commanders-in-chief in council,—I was spending the afternoon with a brother-in-law and some friends in the 88th, with one of whom I had been intimate for several years. I was sitting in his tent with five officers of the regiment, being about to dine together, when Captain Layard brought orders for the formation of a column for the assault on the Redan, my brother-in-law being named as second in command of the storming party of 100 men, and our host as commander of the reserve. I shall never forget the serious hush with which our previous mirth was quelled, nor the serious look which went round the group of brave men receiving that message, which as they knew was to some among them the summons to another world. I accompanied them till they reached the trenches.

There was a fine young man whose face is before me now, as then, when I saw him for the first and last time. He had begged to be allowed to join the storming party in the place of another officer, and his request had been as I think improperly granted. There was something inexpressibly painful to me in looking at the excitement and pleasure which his expression betrayed.

Having returned to a spot whence the principal attack could be seen, I remained there for several hours, not knowing how time passed, and, like the rest of the group, scarcely conscious of the shot and shell which were hissing over our heads, except on one occasion, when a spent-ball, which every body saw coming, passed through the thickest of the throng, killing one man who got confused in his efforts to avoid it. After everything seemed over and the rattle of musketry grew faint, I went back to the camp, and entering my brother-in-law's tent, found him lying with a grape-shot hole in his arm. While sitting with him, to give him drink from time to time, I could hear in the next tent the moans of the commander of the storming party, who had been shot through the abdomen, till about midnight, when their cessation told that his sufferings were over. From time to time a wounded soldier coming up told us how things were going on in the Quarries. We could learn nothing of our friends, except that it was thought some of them were wounded. At last came up the report that one was killed, then another and another, and, as fresh stragglers arrived, the rumour changed into certainty.

The handsome lad upon whom I had looked with such interest was missing, but was said to be lying close to the Redan.

With a heavy heart I rode back to my own quarters in the grey of the morning, meeting with litters on which were borne silently men with pale waxen faces and ghastly wounds. That afternoon I followed to the grave the bodies of three out of the five who had been met to spend the previous evening in social enjoyment.

A day or two afterwards, when dining with General Bosquet, and expressing to him the depression which these events had caused in my mind, I was much struck by his reply. "Ah," said he, "no one but a soldier can know the misery of war: I have passed six and twenty years of my life in burying my most intimate friends."

I had hoped to add to the collection of views which I had formed, photographs of the scenes since so ably depicted by Mr. Robertson, and with that view made everything ready for going into Sebastopol after the attack of the 18th of June, which all

knew to be impending, and which everybody had settled was to succeed so surely, that those who had doubts scarcely ventured to express them. When that attempt failed, and to the list of friends already sacrificed were added new names, I felt quite unequal to further exertion, and gladly embraced the first opportunity of coming away. Having lived for the previous month at head-quarters, which were in a very unhealthy condition, I had imbibed the poison of that outbreak of cholera to which Lord Raglan, General Estcourt, and so many others at head-quarters at that time fell victims, and which the depression consequent upon the losses of the 18th rendered them unable to resist.

Providentially I was able to get on board ship and outside the harbour before the disease came on. Recovering from that, and beginning to regain strength, a fever brought on by overwork and nervous excitement, made me very glad to find myself at home lying silent and dreaming in the midst of dear fameliar faces. So happily ended my photographic experience in the Crimea, with the renewed conviction that "there is no place like home."

MISSING NUMBERS—THE AMBROTYPE.

Pautucket, R. I., March 4, 1856.

Mr. H. H. Snelling—Dear Sir—The recent arrival of the P. & F. A. Journal for Jan. 1856, induces me to again inform you that the September No. for 1855 has not made its appearance, although the July No. (which was promised at the same time, and for which I sent a remittance) has been received.

There are now behind or not received, the Nos. for September, December, 1855, and February 1856, and I should be very sorry not to get them, as I esteem the Journal very highly and was intending to bind it.

I have watched the Ambrotype controversy with much interest, expecting each month to see in the Journal some such announcement as appeared in the January No. from Mr. Simous, of his victory over the "Cutting Patent."

About six months ago an attempt was made to extinguish me because I declined to, purchase a Fir Balsam "right." An establishment was opened just opposite my place, by one of Cutting's victims, and owing, perhaps, to the novelty of the thing, a little stir was made, and I thought it expedient to engage in the making of positives on glass, and did so, finishing them with copal varnish, and sometimes using two glasses, but with the matting between them. I have always disclaimed for my pictures the name of Ambrotypes, but have usually called them Photographs on Glass.

I confess to an unconquerable repugnance to the use of such names as "Ambigraphs," "Lamprotypes" &c. &c., names apparantly borrowed from the "Ambrotype," and therefore conveying the idea of counterfeits.

From the tenor of Mr. Simon's communication I infer, that he has not scrupled to use the name of "Ambrotype" for his pictures, which I can scarcely consider justifiable, for whatever may be the fact with regard to the *process*, I have supposed the *name* to be the rightful property of Mr. Cutting.

If the fact be otherwise, I shall be glad to know it, although I do not think I should ever use it, as I suspect the Balsam pictures will find themselves in bad odor with the public after a little time. I cannot help supposing that M. A. Root is pecuniarly interested in the Ambrotype speculation, I can in no other way account for the eulogistic style which he uses in writing about that style of picture. I have always entertained the highest respect for the opinions of that gentleman upon all subjects connected with the Photographic Art, but my faith has been shaken recently.

Hoping soon to have the pleasure to greet the missing "Journals," I remain Yours truly,

H. H. Richardson.

— We assure our correspondent that the missing numbers were sent the second time as requested, and we can only attribute their non-arrival to the thieving propensities of some of the post office officials, for we are monthly annoyed by similar complaints from all parts of the United States although we take every precaution in our power in having the Journals mailed. Never within our recollection has the Post Office department of the United States been so miserably managed as since the present incumbents came into power. It cost us, on an average, one hundred dollars a year, to duplicate missing numbers. We found it impossible to supply our Philadelphia subscribers until we adopted the plan of sending to them by Express, showing conclusively that the most of the missing numbers are pilfered from the New York or Philadelphia offices. We despair of better things until we have a change of rulers.

In regard to the name given to the glass positives by Mr. Cutting, we can only say, that we are not aware of any law or rule by which the mere christening of the process, "Ambrotype" gives him the exclusive right to the name, unless, previous to using it publicly, he took out a copy-right for it as applied to that particular process. Even this would not give him a clear title to its application to another similar process, as is sufficiently proved by the fact that books are often published by different authors bearing the same title, and which embraced similar ideas, but differently expressed. One man naming his son John, does not give him an exclusive right to that title; or if he invent an entirely new name for him, he cannot prevent another father from using the same for *his* hopeful.

Mr. M. A. Root does own a portion of the Cutting patent for Philadelphia, and for this very reason his opinions as at present expressed should have the more weight, for he, in fact, gives them in opposition to his own interests.—*Editor.*

From the Jour. of the Phot. Soc.

DISHES FOR EXCITING AND DEVELOPING.

To the Editor of the Photographic Journal:

Sir,—In the calotype process none of the operations require so much care as the cleaning of the dishes that are used for exciting and developing; however well the manipulation of the various operations have been done, it is impossible to get good results if any of the apparatus should be dirty.

I have lately contrived a ready method of making dishes for exciting and developing, which I think can be described without the aid of drawings. In the first place, a frame must be made of well-seasoned wood similar to canvass frames used for oil paintings. The sides and ends made of pieces of wood about 2 in. × ½ in., with one or two cross pieces to render the frame quite firm. Round the edges of this frame fasten pieces of wood about ⅜th of an inch thick, which must be about ¾ths of an inch above the level of the frame. It is now ready to receive a glass plate, which must be ground on the edges. I propose to attach pieces of waxed paper about 1½ inch broad, on the edge of the glass plate, taking the precaution to warm the plate so that the paper will adhere. It is now ready to be placed in the frame; but in order to render the the whole perfectly water-tight, it will be as well to place a piece of vulcanized india-rubber cloth, 1½ inch larger each way than glass plate, in the frame; then place the plate on it, and it is ready for use. The following are the advantages of this kind of dish. After each operation the plate can be readily cleaned; the surface of the plate glass being perfectly level, very little gallo-nitrate or aceto-nitrate solutions will cover the plate, the cost will not be more than one of the same size of porcelain dishes; the glaze of the latter are generally very imperfect, and they are never level. The strips of waxed paper ought to be attached first on the under part of the edge of the plate and turned up so as to be nearly the same height as the frame edge. The paper must be thrown away after each day's use, and fresh attached when the plate has been well cleaned.

If you think there is any advantage over the usual glass or porcelain dishes; please insert these few hints in a future number of the Photographic Journal.

I am, Sir, Yours faithfully,

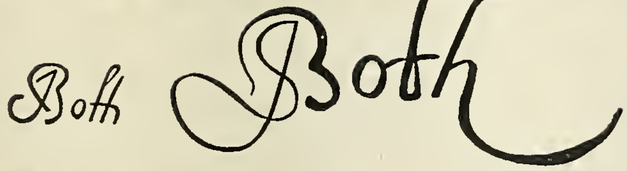
Robert Elliot.

P.S. It will be as well to have the glass plate as near a fit as possible in the wooden frame, so that the edging of waxed paper just bears against the india-rubber cloth and frame sides.

Literary corespondents should, of all men, write legibly. Don't let your manuscript look like the hieroglyphics on a Chinese tea-chest, or the tracks of a spider half drowned in ink.

THE GREAT MASTERS OF ART.

No. VIII.—JOHN BOTH.



WE have sometimes wondered what the old Dutch landscape-painters, journeying as they occasionally did from their own "cloud-capped" land into the south, thought of the sunny region of Italy; how they must have rejoiced in its blue skies, and transparent atmosphere, and clustering masses of foliage, and solemn ruins of ancient grandeur, and the more modern but equally graceful structures erected by the Medici, the Colonni, the Orseni, the Frangepani, and the many other distinguished nobles of that country. What a contrast must all these materials for their art have afforded to such as they had left behind,—flat yet verdant fields, an atmosphere not often penetrated by bright rays of sunlight, and formal odd-shaped dwellings, presenting neither beauty of form nor harmony of proportion. It was only when they had quitted such scenes that their senses could have imbibed the true poetry of nature, and their minds have become impressed by her magic powers; and then only could they gain a right of perception of those extraneous influences which had been at work on the pencils of the great Italian painters, giving to this one the brilliancy of colour, to another the elegence of composition, to a third the power of expression, and to a fourth the union or combination of all these qualities. Nature not only creates the artist, but she instructs him also; endowing him first with genius, and afterwards surrounding him with such studies as are best suited to its development, and of which, in most cases, she offers him the unrestricted use; he is seldom required, like the Egyptians of old, to make bricks without straw.

John Both, whose name is rarely appended to a picture without being associated with that of his brother Andrew, who painted the figures which animated it, was born at Utrecht, in 1610. Their father, a painter on glass, first instructed them in the rudiments of design, and then placed them both under Abraham Bloemaert, the historical painter, with whom they studied for a considerable time. But neither of the youths appeared to possess a taste inclining to history; and John especially, having resolved to become a landscape-painter, they both set out for Italy, and arrived in Rome. Claude was at this period in the zenith of his fame, and his works were so highly esteemed by John Both, that he immediately adopted them for his model, and laboured diligently in the pursuit of his object. M. Blanc whose "Lives of the Painters" we are in some measure following, says that Both was a pupil of Claude, but this opinion is not, so far as we can ascertain confirmed by other biographers. It is, however, quite certain that he studied his style of composition and coloring very closely, retaining at the same time much of that feeling in his subjects which he had derived from the country of his birth; so that it has been well observed of him that his pictures occupy an intermediate place between the rusticity of Ruysdael and the historical style of landscape, so to speak, which Claude and Poussin painted.

The life of a mere landscape-painter generally has in it, as we have frequently had occasion to remark, little of stirring or exciting incident: he is a wanderer by the wayside, or in green fields, or up the verdant hills, or by quiet streams; and when his sketch-book is well stored he returns to his studio and works out his subject undisturbed: hence he seldom leaves to his biographer such materials as, to use an artistic phrase, would make up into a pleasant and interesting picture. Now and then we read of some little anecdote that breaks the thread of his monotonous history, and gives a little variety to the few facts concerning it. Thus, Houbracken, the biographer of the Dutch artists, and a most excellent painter, relates the following concerning John Both. M. Vander Hulk, burgomaster of Dordrecht, challenged Both and Berghem to paint the better picture; each of the competitors was to receive eight hundred florins for his work, but he whose picture was considered to be superior, was in addition, to receive a magnificent present. Berghem produced painting which all who saw it pronounced to be his *chef d'œurve;* it was a passage of mountainous scenery, in which flocks and herds of various kinds were admirably introduced; every one thought the prize would undoubtedly be awarded to him. But then Both's was no less excellent in his peculier style; the judge felt himself in the same position as Virgil's Palæmon when called upon to prononnce between the two rival shepherds:—*et tu dignus et hic.* The generous burgomaster did not, nevetheless, as many would have done, make his difficulty a reason for witholding the gift from either; on the contrary, his decision is worthyof being recorded in the history of Art. "Gentlemen," he said, "you have not left me the liberty of a choice; each of you well deserves the present I had designed for the most successful, since you have both attained so high a degree of perfection." And he munificently rewarded them both.

On arriving in Italy Andrew Both applied himself to study the figures of Peter de Laer, commonly called Bamboccio, a Dutch painter who settled in Rome and distinguished himself greatly by his pictures of rural festivals, fairs, masquerades, and subjects of this description. Andrew, by these means, acquired a remarkable facility in the composition of appropriate groups for his brother's landscapes, and the work of the two was so completely

in harmony, that it is difficult to believe the whole is not by the same hand. Nor was the harmony existing between them confined to their professional labours; "the sympathy of their affections blended itself with the exertion of their talents." At Rome their house was the resort of all the great artists of the time; Claude, the two Poussins, Bamboccio, Herman Swanevelt, and Elzheimer, by whom they were held in the greatest esteem for their genius and excellent mental qualities. Having, however,

THE MULETEERS.

removed for a time to Venice, for the purpose, it is thought, of seeing the pictures of Titian, an unfortunate accident severed the tie by which they were united, and deprived the world of the combination of their powers. Returning home one evening from an entertainment, Andrew unfortunately fell into one of the numerous canals in Venice, and perished before assistance could be rendered him. From the hour of the funeral, a residence in Italy seemed insupportable to the survivor, he therefore determin-

THE FERRY.

ed to return to his native country, and settled himself in Utrecht. There he found his countryman Poelemburg, who had been like himself, but at an earlier date, a pupil of Bloemaert; and he procured his assistance to supply, in some degree, the place of his brother as a coadjutor in his labours. But the painter of sylvan godesses and ancient driads was not quite the artist to embellish the bold scenery of John Both: the delicacy of Poelemburg's figures did not harmonize so happily with the stately trees, and

bristling thickets of Both's landscapes, as did the rough muleteers of his brother. Berghem too showed a right feeling for the artist whom he could not excel, and whom he would not envy, by sometimes embellishing his works with groups of cattle and other figures.

But the void in his heart occasioned by his brothers loss was not so easily supplied; spirit and health finaly gave way under the bereavement, and he died at Utrecht in 1650, at the age of forty, surviving Andrew about five years.

The landscapes of this painter ordinarily represent a mountainous country, upland districts with tortuous paths broken up by the floods or cut through rocks. Along these ways, which have some resemblance to the chain of the Apenines, we see groups of travellers, peasants, and muleteers, both mounted and on foot, the animals with their tinkling bells bearing the produce of the vintages to the neighbouring towns and villages for sale. An example of this class of subject is in the third page of this notice. In other pictures we have an open champaign stretching

THE MOUNTAIN PASS.

along, the sunlight on the green pasturage broken by the shadows of high banks and clustering foliage; or else the scene, full of natural accessories that appear accidental, terminating suddenly in the distance by a line of water, similar to a lake, and as tranquil. Every thing is indicative of Italy, not so much of its classical allusions as of its picturesque rusticity—if one can associate such an idea with a land whose very name seems to give the denial to the fact that rusticity even in the most refined degree could have an abode in it. There is, perhaps, no European country which, in thought, is less connected with all that is supposed to belong to such a characteristic; we read of Italy, and we talk of it too, as the treasure house of all that is beautiful and refined, and rare and costly, both of God's creation and of man's work, and seem to forget that even there the peasant "goes forth to his labour till the evening," and, when his task is done, hastens home to sing and dance merily in the greenwood shade

But after all, the principal personages in Both's pictures are neither the peasants, nor their mules, nor the goatherd keeping watch over his flocks; these sink into comparative insignificance before his stately trees—stately, yet light and elegant withal. And herein his compositions differ in a marked degree from those of Claude, whose trees are usually clothed with thick masses of

foliage, through which no sunbeam appears able to penetrate. Both's ou the contrary, are broken up into a variety of graceful branches, through which the light streams and falls in rich tints upon the ground beneath, or on other objects that come within the range of their influence. Another striking quality in his works is the fidelity with which he deleniated the different hours of the day; so truthful is the expression thus given, that one who examines his pictures attentively for a few minutes can almost determine, if he is acquainted with the peculiarity of an Italian atmosphere, the precise time at which in all probability the sketch was made; for Both, as Claude was accustomed to do, frequently made the open fields his studio.

One of this painter's finest pictures is in the gallery of the Louvre, in Paris; it is a "View in Italy at suuset;" a subject he frequently repeated with some variation of the figures by his brother. A boatman is about to land cattle from his flat-bottomed ferry-boat which has already touched the bauk of the river; a cavalier seems to be waiting the disembarkation to take his turn across; a range of hills rises a little beyond the group of fignres to the left and almost overhangs the water; while two distiuct masses of trees are placed in the foreground, dividing the light which falls upon the latter. In the distance, abutting from the promoutory that terminates the lofty hills, is a portion of a bridge broken, perhaps, by some overflowing of the windiug stream. To the left, in a broad half-shadow that is tinged with the golden rays of the evening sun, a peasant is leadiug his mule; two or three fleecy clouds complete the right of the composition. The whole sceue is perfectly tranquil—full of light; and all the laws which regulate Art have been observed by the painter in his work, with the atmost exactitude.

For his selections of the most picturesque subjects, for the rarity and fulness of his designs, and for the truth and vigour with which he worked them out, "Both of Italy," as he is generally known among the *cognoscenti* in Art, is a model that may be studied with advantage by the young landscape painter; aud, if his works exhibit less ot the grandeur of Poussiu, and of the clasic elegance of Claude, they possess sufficient of both these admirable qualities to please the most refined taste—if not to satisfy it.

Both's only pupils were Henry Verschuring and William de Heausch; the former became a painter of battle pieces aud attacks of banditti; but the latter followed the style of his preceptor very closely, so that the pictures of the pupil have occasion ally been mistaken for those of the master by some who have not closely studied the beauties and peculiarities of Both's pencil—its extreme freedom yet delicacy of handling, and its high luminous coloring.

The value attached to the best works of this master has bceu, in every country where they are known, comensurate with their merits, and there are few of the galleries of Europe of auy celebrity that do not possess some examples of his genius; the finest are perhaps in this country and in Italy. The Munich gallery contains several excellent specimens; others of scarcely less interest are at Dresden, Berliu, and Copenhagen: the museum of the Louvre, in Paris, shows but two, but they are of the highest quality; France was at oue time very rich in the possession of his works, but they have been dispersed at different periods, and found their way into other countries and other hauds. It may be interesting to the curious to know something of the price paid iu France, at differeut periods, for Both's pictures; in England we know that a really good and genuine production is only to be acquired at a large cost. In 1745, at the sale of the pictures belonging to the Chevalier de la Roque, a pair, by Both, one entitled "The Couriers," the other "Winter," were sold for 124 livres, about 10*l*.of our money: in 1777, at the sale of the gallery of Prince de Conte, a landscape of fine quality fetched only 50*l*.: another, at the same period, belonging to M. Poullain, realized nearly the same price, but seven years afterwards, it was resold for about 84 guineas. In 1817, when the gallery of M. Talleyrand Perigord was dispersed, "A View iu a mountainous Country" realized 390*l*.; and in the same year another work of similar character, painted on copper, was sold in the collection of M. de Laperrière, for 460*l*.; aud in 1823, the same ameteur disposed of "A view in the Apenines," for 680*l*. At the sale of the Duke de Berri's gallery, in 1832, two pictures by this artist were disposed of, one, "A View in the Apenines," with figures by Berghem,fetched 383*l*.; and the second, with figures by A. Both, sold for about 133*l*."A View in Italy," was sold from the collection of M. Heris, of Brussels, in 1841, for about 620*l*.; but the highest price realized by one of Both's pictures, so far as our information extends to continental sales, was at the dispersion of the "Perregaux" gallery in 1841, when a landscape, entitled "The Setting Sun," reached the sum of 880*l*.

The works of this painter are much prized iu this country and consequently are eagerly sought after when offered for sale.

If oue may judge from the number of engravings from his pictures, which have appeared in various countries, as well as from the works which we know to be in existance, John Both must have laboured most assiduously in his art; he must also have attained proficiency at a very early age, seeing that he died in the prime of life, and at that period when most artists are only commencing a career.

NOTES OF A TRIP TO EUROPE—No. 3.

Philadelphia, *Feb.* 1856.

Friend Snelling—In my previous letter I was on the point of leaving London for Paris. I took the route by way of Folkstone. I had a pleasant morning for the journey, and we spead swiftly along through the luxuriant vallies of *Old England*—what a garden spot! the meadows looked as if draped in velvet—there is a richness about the verdure unknown in this climate; it was near noon when we reached Folkstone ; we were hurried on board of the steamer, therefore had but little time to see the place. There was quite a large number of passengers, mostly Londoners, ou their way to the French exhibition ; amongst them were a party of cockneys, who, it was evident felt some uneasiness at the idea of crossing the channel, for they early began to apply the brandy preventative. The boat was quite small, nothiug to be compared to those splendid establishments to be found in this country. As soon as all the baggage was thrown upon deck—for such I should call the bad management in getting it from the cars to the boat—we started off. I was taken up for some time watching the picturesque appearance of the loug line of chalk cliffs stretching along the coast, but I soon had other scenes to attract my atteution, for as we advanced towards the centre of the channel it was evident from the motion of the boat that we should have a rich time of it, as it soon began to whiten the gills of the cockney party, as one by one they began to grow silent and settle down—it was all of no avail, they had to yield, and such a scene that followed ; such expressions as they rolled up their eyes so pitiously to the steward—who was first here and then there as the omnious sounds gave token of their troubled conditions. I was much amused as I watched their manuœvres, as they wrapped themselves up in their shawls aud stowed away behind the barrels and boxes, one would hardly have taken them to be human beiugs, they looked more like huge bipeds tryiug to disgorge their own extremities. This state of things lasted for over an hour, but as we neared the quay at Boulogne, the still water had the desired effect to somewhat restore the order of things ; the roseate hue of the morniug had fled from the cheek of many, while the yellow cast of countenance gave evidence of the bitterness of their bile, which, no doubt, will cause them to remember their trip.

As we neared the wharf I was much struck with the clean picturesque look of the place, particularly after dirty smoky London. When we landed, we were all marched to the custom house where I took my first lesson in the passport system, and had the satisfaction of seeing my valise rummaged over by some polite official, who, when satisfied that I had nothing contraband, bowed me off. As soon as I reached the street, I was beset by a swarm of cabman who deafened me with their *gargon*—it was all French to me—did not understand a word of it. I was at last obliged to get upon the top of an omnibus to rid myself of them ; by this means I got to the depot. Finding

the cars did not start for some time I entered the *Caffe*, and I have no doubt you would have laughed heartily to have heard me give my orders to the garçon—of *course they were given in French*—it is true he did not seem to understand them. I suppose he took me for an Englishman, for he brought me roast beef for my order of boiled mutton ; it was of but little matter for my sea ride had sharpened my appetite so that a worse dish would have been palatable. The time arrived for the departure of the cars and off we went ; the road for some distance lay through a sandy unproductive country; what fertile spots there were were cultivated in long narrow stripes, not in whole fields as with us, but a number of things growing in the same field. The only thing I could admire for the first part of the journey, was the picturesque appearance of the huge wind-mills perched upon every eminence, with their massive arms slowly revolving by the gentle breeze. We passed through no places of note until we arrived at Amiens, where our stay was short ; as we passed through I caught a sight of its famous old Cathedral, which is said to be one of the finest Gothic edifices in Europe. It was commenced in the year 1220 and was not finished until the latter part of the 14th century. The interior is grand and imposing. As we neared the capital the country began to improve, and in many places as we wound along the river and canal, I caught glimpses of beautiful bits for the Photographer. It was after sun down when we arrived at Paris and we were detained some time until the baggage was examined. I was impatient ; I was anxious to tread the streets of the gay city, and it was with feelings of intense curiosity I gazed at everything we passed as we drove to the Hotel de Paris, (which I can recommend for high charges)—a stately edifice ; but while I gazed upon this enchanted scene memory was busy recalling the history of the spot ; the heart shudders when we reflect, that here, upon this site, the guillotine did its dreadful work, until the very earth became saturated with human blood, thousands having fallen victims to the fury of madmen ; alike, the innocent and the guilty ; amongst the number, Louis XIV. and Marie Antoinette, his consort.

Sunny France ! God forbid that ever again Reason should be cast from her throne and fanatics riot in her stead. Thus I mused as I wandered back to my Hotel.

F. D. B. Richards.

From the Jour. of the Phot. Soc.

PHOTOGRAPHIC RESEARCHES ON THE SPECTRUM.

The Spectrum Camera, and some of its Applications.

BY WILLIAM CROOKES.

13. In Vol. i. page 98, of this Journal there appeared an account of some experiments on which I had been engaged with the solar spectrum, and a description of an arrangement for forming it in a state of purity. The results which I then obtained were so novel and unexpected that I determined upon instituting a more complete and thorough examination than had hitherto been undertaken, of the photographic action of spectra from different sources of light, feeling convinced that by penetrating a little deeper into the rationale of photography, and trying to obtain an insight into *causes* as well as *effects*, thus rendering it the interpreter of the symbolical language of nature, our knowledge of the subject would be greatly increased; and while the art of photography is daily advancing with such giant strides, photography as a *science* should be enabled to keep pace with it, and even suggest a solution of many practical difficulties, which would otherwise stand in the way of progress.

14. The reserches of Becquerel, Stokes, and others, have shown that even the clearest piece of glass is absolutely opaque to rays of a high refrangibility, and that rock crystal is the only truly diaphanous substance. In an investigation, therefore, which was inteuded to imbrace the chemical effects of all the rays, it was necessary that rock crystal should be substituted for glass, so that none of the rays should have their intensity lowered by passing through a refracting body which might be to them partially, if not entirely, opaque.

15. In the paper above referred to (paragraph 2.) I described the arrangement which I then adopted for obtaining the solar spectrum; but as that was projected into a darkened room, the motion of the sun was continually requiring fresh adjustments in the different parts of the apparatus, and even then limited the time for the experiments to a few of the morning hours during which the sun shone on that side of my laboratory. To obviate this inconvenience I devised a portable *spectrum camera*, which I will now briefly describe. The accompanying drawing is one-tenth the real size.

The slit, the repeated juxtapositions of whose differently refracted images form the spectrum, is here placed horizontally, and is capable of having its width regulated by means of a fine screw. It is placed at A, the extremity of a brass tube A B. This screws into a wooden frame C D E, and the two move on a horizontal axis at F, and are capable of being fastened at any angle to suit the varying altitude of the sun by means of a clamp, screwing on to the support G H K. Working on the same axis F, but quite independent of C D E, is a camera body L M N, open at each end, and capable of being likewise supported at any height by screws fastening on to P Q R. At the end M N of the sliding body M N O, is a groove for the focussing glass and plate-holder. A lens is fixed at the extremity B of the brass tube, and the prisms are fastened with their refracting edges downwards into a wooden frame, moving on the common axis F, independent of the other two frames, but capable of being at any position firmly clamped to C D E, and of then partaking of its angular motion. The whole stands on a base board S T.

16. The two rock crystal prisms, which I was fortunate enough to obtain from Mr. Darker, are most admirable specimens of his workmanship. Their refracting faces are 1·8 by 1·1 inch, and the angle is 55° ; they are cut from the crystal in such a manner that when in the position of *minimum deviation* (17) the rays pass through them parallel to the optic axis of the crystal, thus avoiding the ill effects which would be caused by double refraction. It is necessary to employ two prisms, one behind the other, in order that the spectrum may be of a good length ; the dispersive power of quartz not being very great. The lens, also of rock crystal, is a meniscus, 1 inch diameter and 12 inches focus, and so placed that the axis of the lens and crystal are identical.

17. To put the instrument in adjustment, it is arranged so that the rays of the sun may pass along the axis of the tube A B, through the slit and lens, on to the prisms ; and then the frame holding the latter is rotated on F till the refracted ray is least bent out of its original direction, and is then firmly clamped to C D E, so that ever afterwards the slit, lens, and prism will retain the same relative positions, independent of the movement of A E in altitude.

18. When it is required to submit any compound to the action of the solar spectrum, the instrument is turned in azimuth by means of S T, and the tube A B moved in altitude until the sun shines directly down it, which can be known by the shadow of A covering a certain marked space on the front of C D. The altitude of M N L is then arranged so that the spectrum is projected on the focussing screen at M N, allowance being made for the enormous extent above the visible rays to which the chemical rays extend. The sliding body M N O is then moved until the fixed lines in the required part of the spectrum are brought into focus (the higher rays having a longer focus than the lower) ; and a dark cloth being thrown over the body of the apparatus around C D E, to keep out light, the plate holder is substituted for the ground glass, and the substance under examination exposed to the influence of the spectral rays.

19. The spectrum being nothing more than a multitude of images of the slit placed side by side, it is evident that the motion of the sun can in no ways affect the steadiness of the fixed lines on the plate, but only their intensity. If requisite, therefore, the exposure to the spectrum may be prolonged for hours, by causing two screws to act on the end s of the base board, one depressing or raising it according to whether it be before or

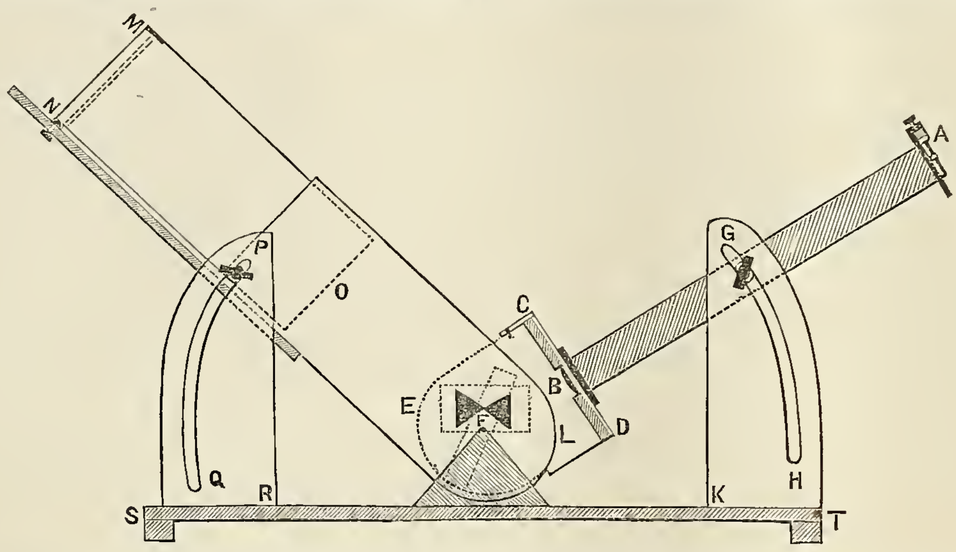
after noon, and the other moving it side ways, the end T remaining fixed. The position of the camera with regard to the sun may then be adjusted by hand every two or three minutes.

20. In possession of this instrument I was enabled to extend my researches much further than would have been otherwise possible. Although I have been employed on this subject during my leisure time for upwards of two years, the investigation is not yet sufficiently complete to warrant my laying the results before the Society in a connected form. I have, however, in the course of my experiments met with several curious facts, an account of some of which may not prove uninteresting.

I was engaged some times since at the Radcliffe Observatory, Oxford, in an investigation on the most fitting composition for the bath used to iodize the waxed sheet of paper to be employed for their photo-metorographic registration; and in this instance, amongst many others, my spectrum camera did me good service.

21. The results of numerous experiments, which I need not mention here, had convinced me, that for ordinary purposes iodide of silver *per se* was the best sensitive surface for receiving an image in the camera; but on making use of that body in these operations (by employing pure iodide of potassium in the bath) I was surprised to meet with results, for which I was at first unable to account. A little consideration, however, showed me the direction in which I was to look for a remedy. The experiments which had led me to prefer iodide of silver as a sensitive, surface, had all been performed with sunlight, either direct or more frequently in the form of diffused daylight. In this case, however, coal gas was the source of light; and if, as was very probable, there were any great difference in the quality of the light from these two sources, the superiority of iodide over the bromide or chloride of silver would still be a matter for experiment.

22. A comparison of the spectra of the two kinds of light showed a very marked difference; while in sunlight the spectral rays which are around and above the fixed line G (the indigo and higher rays) are so intense and numerous as completely to overpower the small space between and about F and G (the blue and upper portion of the green), a part of the spectrum which affects bromide more than iodide of silver; in gas-light the case was quite different: the great bulk of photographic rays was found to lie within the limits of the visible spectrum and consequently



the photographic action of this light was likely to be far more energetic on bromide than on iodide of silver.

23. These suppositions were fully borne out by experiment: on introducing a little bromide of potassium into the iodizing bath, the change was very apparent. It requires a certain proportion to be observed between the two to obtain the best results. If the iodide of potassium be in excess, the resulting silver salt will be wanting in sensitiveness, requiring a comparatively long development to render an image visible; while, if the bromide be in excess, there will be a great want of vigour in the impression, the picture being red and transparent. When the proportion between the two is properly adjusted, the paper will be extremely sensitive, the picture presenting a vigorous black appearance, without the least approach to red. The addition of a chloride was found to produce a somewhat similar effect to that of a bromide, but in a less marked degree. As no particular advantage could be traced to it, it was not employed.

24. Another occasion on which my spectrum camera proved of great use, was in the choice of a glass for the window of my photographic laboratory; one which should admit of abundance of light, and still filter off, as it were, all chemically acting rays.

Usually yellow calico is employed, but it is a most imperfect and unsafe material for such a purpose. One thickness, it is well known, allows white light to pass; consequently an increase in the number of folds merely diminishes the amount of transmitted white light, and in the same degree obstructs the illuminating yellow light.

25. On examining some pieces of glass of different colors in the spectrum, I found several which would answer the purpose. From these I picked out one of a deep orange color, as being the more suitable. It was perfectly opaque to rays above Frauenhofer's line E (from the green upwards), but transmitted the lower luminous rays with facility. I had a piece of the glass, nearly a foot square, fitted into the shutter of my room, and although during one part of the morning the sun used to shine directly through it on the glass bath (uncovered), in which perhaps a collodion plate was being excited, I could not trace a single failure to this cause; and while, in point of security, it was at least equal to four or five thicknesses of yellow calico, it was incomparably more pleasant to work by, as when the sun was shining, the darkest corners of the room were illuminated as if by daylight.

26. On several occasions, when looking over the photographs of spectra which I had taken during the day, I was struck with the greater number of rays of increasing refrangibility which were copied at some hours compared with those taken at others; the length of the spectrum at the more refrangible extremity being apparently exactly proportionate to the height of the sun above the horizon. This seemed to point to an absorbing action which the earth's atmosphere possessed on the higher rays; a little observation soon proved this to be the case, for even within half an hour of noon the sensitive plate showed me that some rays were obstructed which easily passed through the atmosphere when the sun was on the meridian.

27. As the spectrum at noon contains higher rays than at any other hour of the day, so the noonday spectrum at midsummer ought to contain more and higher rays than are possessed by the corresponding spectra at any other time of the year. It

became interesting to see whether these theoretical considerations were borne out by facts. This was in the spring of last year, and a comparison of the midday spectra taken then with those taken in the winter showed me that the reasoning held good so far. Continuing the examination at every opportunity, as the light gradually came less obliquely through the atmosphere, new rays began to be apparent, until at midsummer, when the sun was on the meridian, I succeeded in obtaining evidence of the existence of rays which the most prolonged exposure failed to detect at any other time.

28. Some curious speculations arise from these facts. Should we be able, by working under a vertical sun, and with every advantage of cloudless sky, &c., to increase still more the length of our spectrum? Can we attain the limit of solar refrangible rays in this direction? Or is it not more likely that there are emanating from the sun torrent of rays which never approach the earth,—rays which beating against the upper stratum of the atmosphere, are themselves destroyed, but whose vibrative energy is transmitted to us with increased wave-length and lowered refrangibility, in the form of heat or light?

From the London Art-Journal.

SUGGESTIONS OF SUBJECT TO THE STUDENT IN ART.*

BY AN OLD TRAVELLER.

CHAPTER I.

Introduction—Effect of Themes repeated—Fields open to the Artist—Sources awaiting the Pioneer—Pictures lost in Portfolios—Hypatia in the Schools—The Daughter of Theon borne to the Basilica—The Captive's prediction to Agrippa—The Emperor Charles V. and the Woodman—Illyrian Ballads—The Heydukes—Love wakes the Dead—St. Mary the Egyptian—Dante—The Angel at the Gate—Monsieur du Corbeau—An Irishman's Version of La Fontaine—A Georgie of the Day—Immortal Youth of Oxen: Mago to wit—Concino Concini—Eleonora Galigai—Death of Gustavus Adolphus—Francis Albert of Saxe-Lauenburg—Duke Bernhard of Saxe-Weimar.

Among the many and various merits of Mr. Leighton's truly admirable work, "The Madonna of Cimabue, carried in procession through the Streets of Florence," not the least important is the fact that the painting is a highly suggestive one. Who can stand before this picture without finding incident after incident recur to his memory, each attaching itself in some manner to the story of the well-known personages represented in the painting? Now we have some touching or stirring episode, heard once again in the musical periods of Dante, or there rises before us some noble structure, recalled by the figures of Arnolfo di Lapo, Nicolo Pisano; then passes some jacketed angle, or other quaint apparition, summoned to the minds' eye by the forms of Gaddo Gaddi or Simone Memmi. Or it may be, that the more youthful spectator shall be laughing in his heart, as he pictures to himself some wicked prank performed by the mischief-loving Buffalmacco; wether fixing his tiny torches to the backs of great beetles, and setting the creatures to crawl about his chamber, in the hope of curing his master Andrea Tafi, of the inconvenient practice, adopted by the latter, of rousing him to his work before the dawn; or wether salting the broth of his neighbour, Capodoca, in return for the music of that spinning-wheel, which the goosehead's † wife did not fail to set whirring, before Buffalmacco had well laid his head on his pallet—the painters couch, unluckily, standing in too close proximity to the instrument of her industry.

It will be remarked that we here allude chiefly to the facts and incidents recalled by Mr. Leighton's "Cimabue," making but slight mention of its higher action on the regions of thought and feeling. The obvious effect of the work in these directions we do not now insist on: our business for the present is rather to invite attention to the *many* pictures existing in and called up by the *one* painting before us; and we are led to confine ourselves to this consideration by the dearth of *subject* that would seem to exist among artists, if we are to judge by their very frequent reproduction of the same idea, and by the pertinacity with which they cling to some few hacknied themes.

Certain remarks to this effect, with expressions of *regret that a new and good subject was not more frequently treated by our rising artists*, were heard to proceed from a group of accomplished amateurs, at the private view, on the opening of the Royal Academy's Exhibition, in the present year, and they were such as might have been listened to with advantage by more than one amply-gifted aspirant to the honors of the brush.

For how many a nascent light is extinguished by the deadening chills of that indifference with which the ordinary spectator turns from the oft-repeated tale, but too generally presented by the canvas of our painters! Or if to this it be replied that the true master in Art, the judge, on whose decision the student's hopes are hanging, will detect the merit of the work, however hacknied its theme, may not the *lover* of Art rejoin by asking, "Why, yet, should the youthful painter do his genius the wrong that results from ever harping on so few strings, when he has the full diapason wherewith to charm the spheres? Wherefore will he submit to endure the cold reluctance of that faint regard which is all we give to the well known, and often related, when the boundless universe, with mines of yet unappropriated wealth lies before him? when, not this world only, 'with all that it inherits,' but every other also, with whatever riches they may be endowed withal, is *his* domain!"

Yes, certainly; for if science have her limits, that she may not overpass, none have yet been laid down for the realms of imagination. Let the learned waste their breath over such questions as wether this or that planet have its dwellers; but for you—Oh, ye of higher destinies! the radiant creatures that make bright *your* visions, shall richly suffice to people each and all, if such shall be your pleasure! Admitting then, that you have "chequered worlds," what shall forbid you to "imagine new?"

But is this so? Has the painter veryly, nothing more remaining to him beneath the glimpses of the moon? Has he indeed exhausted all the resources of our own poor planet? Can the history of nations offer no event of interest sufficient to tempt his notice? Is there nothing in poetry that may stir his spirit? Does the drama present no scene still worthy of his pencil? Has exquisite Nature no effect, as yet unmarked by the crowd of her lovers! Nay, has not our daily life full many an incident yet untold of the limner? Enough there is, in each and all of these limitless regions! Do but look for yourselves, ye who aspire to join that band of immortals, amidst whose shining ranks "Cimabue" so worthily holds his place. Follow not each on the trace of the other, as do sheep that would enter the penfold, but acknowledge, once for all, that Judith, with her ill-won trophy, is not the only treasure to be gathered from the stores of Holy Writ; that his Ophelia, his Beatrice, are not the creations of our world-adored Shaksphere; that the Florentine has other pictures beside that of his Francesca; or—to descend at once into such an atmosphere as we have strength for breathing in—that one may at length be supposed to possess a sufficiency of Marianas, more especially when we consider how few of those paraded before us bear the palest resemblance to that Mariana of the poet, whose delicate presentment is but marred by the many counterfeits usurping her name.

Should then the painter be a book-worm, perpetually hunting

*[We have for a very long period desired to obtain a series of papers that might be so construed and arranged as to supply suggestions of subjects for the artist. The task we know to be one of no ordinary difficulty, demanding a combination of requirments very rare—extensive reading, acquaintance with many languages, the advantage of travelling in several countries, and, above all, an intimate acquaintance with Art, in the past and in the present, and a power to estimate its wants, its capabilities, and its results. The accomplished lady who has commenced these papers, has already obtained the respect and confidence of the artists by her translation of, and notes to, Vasari; and the grace and vigor of her style have obtained for her a wide popularity. We believe she has visited all the leading capitals of Europe, where her chief objects of attraction and study have been the collections of pictures; her other advantages are of a high order, and we believe few persons could be found so well qualified to execute the task we have had the pleasure to place in her hands. We have no doubt of seeing the results of her labor and research in our future exhibitions, giving to them a variety and a character hitherto unknown to them.—Ed. *A. J.*]

† "Capodoca," *i. e.* "Goosehead," was the bye-name given by Buffalmacco to the neighbor in question.

through the widely spreading regions of storied eld, for the "subject" that in such case, he would, perhaps, be slow to find? Or should he consume his days in the study of those "modern instances" so much less likely to reward his labour? By no means. There is not indeed any great danger in this our time, that the younger votary of Art should wear his eyes out over black-letter; and if the many among his brethren who have made shipwreck on the rocks of commonplace, do not warn him from putting his trust in the last new poem, or "the novel of the season," —Heaven save the mark!—no lamp that we have the force to light could avail to serve him for a beacon; nor is he of the number of those for whom we could hopefully sound the note of warning.

But the question of how, and to what extent, the artist should be a reader, is one into which we are not now about to enter; here, as in all beside, the golden means is, without doubt, the golden rule; and in no case do we advocate undue devotion to book-lore, whether of the old or the new. Nay, since life is indeed short, and Art so long, there at once arises the question, has the painter leisure for protracted communings with the historian and the poet, the dramatist or the mythologian? and we incline to think that he has not. His hours are all too few for the various studies attaching themselves peculiarly to his own most glorious art. The demands of the painting-room, with its numerous dependencies, and often conflicting claims, have the right to supersede those of the library, and therefore are we about to try if we cannot assist the student to economise those precious hours. We propose, that is, to delve for him, in the fields extending their illimitable space around us, presenting for this selection whatever may be found, that shall seem to offer matter worthy of his notice.

In this attempt to serve as the painter's pioneer, we shall not confine ourselves to order of time, nor seek to establish arrangment as to class of subject. Passing through all ages, and examining each period of the world's progress, we shall levy contributions from all sources, and take our spoil wherever it may be found; our object being to offer suggestions that may suit themselves to all good tendencies, and gratify every pure taste. Thus, times, ancient or modern; lands, far or near; story, national or personal; incident, grave or gay; each in turn shall be made to render tribute, and take part in that service of the youthful student in Art, whereunto we propose to devote the pages that follow.

Nor, among the sources whence we may probably draw, for his advantage, will the least abundant be found in those stores of undeveloped thought, often much lamented over by the present writer, during a life-long perambulation through all the best-known, and not a few of the more obscure, Galleries of Europe.

We allude to the many admirable designs lying incomplete,—perhaps never to be completed—and now lost amidst forgotten leaves in the numerous portfolios, over which we have not unfrequently been permitted to pass a delightful hour, when "living glorious days" among the studios of northern or southern cities. In the number of these has been found many a well-selected theme, rarely carried beyond the life-like sketch, dashed off in the first heat of conception, or, if worked out into the series of studies, serving to exhibit the more advanced purpose of the author, yet never matured into the noble and admirable picture of which not a few give ample promise.

"Hypatia in the schools" and "The daughter of Theon borne to the Basilica" where the titles appended to two of these sketches; and in this instance the world of Art has sustained all the greater loss from the non-completion of a worthy purpose, because the hand of the artist is now cold in death. Nor has this subject been treated, so far as we know, by any other master.

In the first of the works in question, the beautiful daughter of Theon is presented in the midst of her disciples. She has risen to receive the Patriarch Cyril, who is entering on the one hand, while Orestes, Prefect of Alexandria, departing on the other, turns a glance of anger and disdain on the patriarch. This last circumstance shows the point of time selected to be that when enmity of these rivals in ambition had reached its climax, and was soon to result in the destruction of the virtuous Hypatia.

These sketches, some parts of which are exquisitely finished, exhibit many high qualities. The artist represents forcefully because he has felt strongly—one of the first requisites to success. His composition is clear and simple. The principal groups are nobly conceived, while the subordinate figures, which are numerous, give occasion for a rich variety in attitude and expression; nor has the master neglected his opportunity. The face and form of Hypatia, in particular, are remarkable for their intellectual beauty and high refinement: the *pose* of her figure is simple and elegant; from one hand she is laying a scroll (on which may be read a portion of the word "Diaphantus," in the Greek character, showing that the beautiful sage had been engaged with a work of that rhetorician, when interrupted by the visit of the Prefect), while with the other she has gathered up the ample folds of her flowing drapery, her action exhibiting inexpressible grace and dignity. The mingled sweetness and gravity of her features are in perfect harmony with that high character for purity, diffidence, and every other feminine virtue, accorded to Hypatia by the united voices of history. Her finely-formed head is turned towards the haughty figure of the approaching Patriarch, on whom she has fixed the calm gaze of her thoughtful eyes, and whose form—of truly regal port—comes proudly sweeping towards her, with a movement, the life and animation of which are among the highest merits of the work. The architecture is of correct proportions; and the minor accesories have a propriety and significance which do but increase the regret of the beholder, as he considers that all is but a promise not destined to be fulfilled, unless, indeed, some youthful aspirant, becoming sensible to attraction of the subject, as here presented to him—but treating it according to the dictates of his own genius—should some day establish his fame by the truthful representation of a woman who so well deserves to be commemorated.*

In the second sketch the calumniated Hypatia is in the hands of her ruthless murderer, the fiend-like Petron, who has dragged her from her chariot as she was returning from the schools. He directs his myrmidons towards the basilica, within whose desecrated walls her pure spirit was destined to depart, and seek congenial skies, but not until the wholly innocent victim of an implacable hatred had suffered torments such as memory shudders to recal. The head of Hypatia is the only part of this study that is more than faintly indicated; the demon counteuance of Petron (or Petrus as he is also called) alone excepted.

The following passage has been more than once discussed by the present writer, with very competent authorities, all of whom have admitted its aptitude for the purposes of the Painter, it is further recommended by the easy accessibility of the author, who is, indeed, in the hands of all.† The words of the writer are these:—

"Now Agrippa stood in his bonds before the royal palace, and leaned on a certain tree for grief, with many others who where in bonds also. And beholding a certain bird on the tree (the Romans call it Bubo, which is an owl), one of those bound, a German by nation, asked who was that man clothed in purple, and having been told, he begged leave of the soldier to whom he was chained, to approach him. Being suffered to do so, the German captive addressed Agrippa in these words:—'O young man, know well that thou shalt soon be delivered from these bonds, and wilt attain to such dignity that he who now pities thy hard fortune shall envy thy greatness. Know also, that when thou shalt see this bird once again, thou wilt then have but five days more to live. I appeal to my own country gods as well as to thine, that these words are true; and I adjure thee by all these gods that thou forget not my bonds when thou hast obtained thine own freedom, but seek to deliver me; that I be witness to thy good fortune.'"

The life of the Emperor Charles V. is one that has received due attention from the painters, but here is a short anecdote re-

* See Moreri, "Dict. Hist.;" or the English reader may consult Enfield, "History of Philosophy."

† Josephus (Whiston's translation), "Antiquities," Book xviii., chap. vi., sect. vi.

lated by Sandoval, in his history of that monarch, which appears to have escaped their notice, although not incapable of effective delineation, as was proved by a spirited design made, at the suggestion of the present writer, by a student in the gallery of the Academy at Venice:—

"The Emperor was hunting the stag at no great distance from his capital, and chancing to outstrip his attendants, struck the quarry while thus alone. He had scarcely done so before he espied an old woodman, driving an ass with a load of wood on its back.

"'Lend me thine animal to convey my game to the city," said the Emperor, 'and thou shalt be paid for his labour and thine own.'

"'Not so brother!' returned the woodman; yon stag is a heavier weight than my beast may bear. You are stronger than he, and might carry both him and the stag together, if need were. Take your game on your own shoulders, then, and God be with you.'"

The scene of this incident, as given by the Venetian above alluded to, is a forest-glade of surpassing beauty; the group formed by the colloquist and the animals, placed partly within shadow of some noble trees, while a stream of sunlight pouring down a distant ravine, gives to view the retreating figures of a hunting-party, yet without unduly distracting the attention from those in the fore-ground. Of these, that of the emperor exhibits the form and head rendered familiar by his numerous portraits, but wearing an expression rarely seen on it,—amused surprise, namely,—at so unwonted a circumstance as the refusal of his request, and the puzzled half-doubting look of one not yet certain that so strange a thing can have occurred. The sturdy determination of the woodman is, nevertheless, sufficiently obvious in his attitude and action, as he turns the head of the ass to lead him thence; nor is there a trace of indecision in his countenance which is yet not stern or displeasing; on the contrary, it is that of a perfectly good-humored, and very handsome old man. The face and figure of a stolid-looking peasant boy, who accompanies the woodman, lend additional variety to the expressions depicted.

Inexhaustible is the wealth of picture to be found in the national songs and ballads of the Sclavonic tribes, and of all their congeners. Those chaunted by the peasant of Illyria to his single-stringed guitar, called the guzla, are more particularly valuable as viewed in this light. Among them is one composed by a performer who enjoyed high reputation in his country, and from this more than one fair canvas might be filled. The composer is Hyacinth Maglanovich, and the ballad, called "The Death of the Heydukes," is as follows:—

"Within the shade of a deep cavern, and stretched on its hard floor, lies a brave Heyduke, the dreaded Christich Mladin; beside him kneels his faithful wife, and at his feet are their two dauntless sons.

"Three days have they remained without food, nor hath the blessing of water moistened their lips, for each pass of the mountain is held by their foes, the cowardly Pandours; yet none dare suffer a plaint to be heard, for they fear to displease Christich Mladin.

"On the fourth day spake his wife; 'May the Holy Virgin take pity on us, and deliver you from your enemies,'—then she breathed a sigh and died. With eyes unwet Christich Mladin regarded the dead form of the wife he had loved, but his two sons wiped away their tears when he saw them not.

"When night fell, the elder became frantic; he drew the broad hanzar* from his belt, and glared on the dead, as doth the wolf on the lamb,—but his brother siezed the weapon, and piercing his own arm, he said, 'Drink of my blood, O brother and commit no crime. When we have all died of this fire of thirst, shall we not return and quaff the blood of our enemies?' †

Then rose Christich Mladin from his lair. 'Children,' he said 'it is enough! we will descend to the plain. Better is a true bullet than the grim death of hunger.' These words uttered, all three rushed down with the rage of wolves, each slew ten men of the foe, each received ten bullets in his heart; but when the dastardly Pandours had cut off their heads, they dared not look in the faces of the slain, so heavy on their souls lay the dread of Christich Mladin and his children."

* Hanzar, knife or dagger.

† Belief in the existence of vampires has never been extinct among the Illyrians, and many a man of their vengeful tribes is said to console himself in death with the thought expressed in the text, that of returning as a vampire to drink his enemy's blood.

Of a different character, yet not without its uses for the painter is the following fragment of a ballad still sung by the peasantry on the eastern frontier of the Austrian Empire; that joining the Turkish border; namely,—

"The warden of the tower hath the fairest of daughters, but the eyes of a Mosleman captain have fallen on the maiden, and her tears have washed the roses from her cheek.

"Doth not the proud one say, 'Give me to wife that sweetest maid;' but Ilanka beheld her father tear his beard, as he listened to the words of the messenger,—her heart hath moreover, been wiled from her keeping, she hath given it to a brave Tambourdgi, and she bids them prepare her grave, saying, 'Better for my mother's child is the earth of her tomb, than the pearl-bestrewed cushions of a Moslem dwelling.'

"Then the captain of the misbelievers came to demand his bride. He came in his youth and beauty, with the love of his heart beaming forth from his eyes, for he had watched the maid in secret, until his soul had become one with hers,—and well had he taught her to love, though she knew him not, save as the humble Tambourdgi.*

"But they bade him look on the cold bier where she lay, and told how her bridal bed had been prepared beside her mother's grave. 'Nor long for me shall wait the angel of the tomb,' were his words as he bent, with a lip that trembled in the anguish of despair, to press the farewell kiss of a hopeless heart, on those eyes that should have been the light of his own.

"When lo!—mark ye the wonder, maidens—the lids of those eyes rise softly,—their beams shine forth—the celestial blue!—and the setting sun hath seen the Moslem bear a willing bride to his home."

From that inexhaustible storehouse of painters, the legends of the saints, even the older masters have but very partially drawn, confining themselves to some few constantly repeated subjects, that will at once recur to the memory of all who are familiar with foreign galleries. But among these often related stories, we do not remember to have seen any work commemorating the meeting of St. Mary of Egypt with Zosimus the anchorite, one slight study alone excepted, and this, though subsequently worked out to a certain extent, neither has been, nor will be completed. Yet the subject is one not incapable of rendering pictorial effect. St. Mary has discovered the anchorite on the bank of a wide and rapid river, but she is herself on the opposite shore, and cannot find bridge or boat to cross the stream. Undismayed by what would in most cases prove a formidable obstacle, Maria Ægyptiaca, as this saint is called in the Roman church, bids the holy man cast his mantle on the waters; this he accomplishes at her bidding, and floating over to the bank whereon she stands, that frail-seeming bark receives the saint, and bears her safely to the desired shore.

In the study of the subject just alluded to, the figure of the old man, "black with fasting," as the legends describe him, is placed beneath an over hanging rock,—that of St. Mary, remarkable for grace and beauty, floats prosperously towards him; the landscape is a fine one, and the amazement of two herdsman, who behold the saint proceeding on her voyage, is extremely well-depicted. One of them has fallen on his knees in the act of adoration.

In the eighth canto of Dante's Inferno, and towards the closing lines of that canto, is a grand picture yet unpainted, so far as the knowledge of the present writer extends. The frescos executed in the Villa Massimi, at Rome by Philip Veit, Overbeck, Julius Schnorr and Conelius, may possibly comprise this subject, but the writer cannot recall it, and does not believe it to be in-

* Tambourdgi, drummer.

cluded. A slightly similar, but much less important theme was ably handled by Moralt of Munich, a pupil of Cornelius, in 1843. This picture, an oil-painting, will be in the recollection of many, and of Flaxman's Outlines to Dante no mention need here be made, since they are familiar to all; the passage in question is, however, not included among those chosen for illustration by the great sculptor. But whether painted, and whether sculptured, or not, nay, even if treated by all who have sought inspiration in the Divine Commedia, from the time of Dante downwards, the subject is one not sufficiently known in the country, and the student who shall choose it will do well.

The Poet is advancing with his guide towards the city of *Dite*, near the vast gates of which are bands of fallen spirits. But their pristine radiance is not wholly lost beneath the shadows of the demon nature fast involving them,—their forms are yet grand, their features retain a mournful beauty, or, at the worst, are but partially marred by a bold defiant haughtiness, which is yet not all demoniac; one of the number, only, exhibits the malignant aspect of a being wholly corrupt. They are pouring into the city—after a vain attempt on Virgil's part to procure admission for Dante, and are closing the ponderous gates.

But a Spirit of light is meanwhile descending, his mighty pinions bear him irresistably onward, and towards the city—the giant valves of its portal shall be cast wide by his touch, and the Florentine, with his Mantuan guide, shall proceed to explore the marvels within.

Dante declares the angel to be as that of the mighty rushing wind: the whole passage is too long for quotation here, but a few lines describing the advance of the celestial visitant, may be acceptable. The student who shall desire to read the whole will find it in Canto ix, 66,—or if he prefer a translation, that of Cary will serve his purpose well; it is from him that I borrow the version appended in the note, since a more faithful one could not easily be made. The words of Dante are these:—

"E gia venia su per le torbide onde,
Un fracasso, d'un suon pien di spavento,
Per cui tremavan amendue le sponde,
Non altrimento fatto che d'un vento,
Impetuoso per gli avveri ardori,
Che fier la selva, e senza alcun rattento,
La rami schianta abbatte e porta fuori,
Dinnanzi polveroso va superbo,
E fa fuggir le fiere, e lipastori."*
INF., Canto ix., 66.

That the comic element cannot be safely admitted to form one of the resources of the artist, without much reserve and discretion, is a truth but rarely disputed; the mere buffoon, the coarse caricaturist, are indeed not entitled to the name of artist and soon find themselves reduced to their true level. Altogether different is the condition of him with whom that element is but one among the many which go to form genuine humor. The place appointed to the possessor of this "subtle quality" in the temple of Art may not be among the highest, but he holds it by imprescriptible right, nor is it one that may be justly disdained.

For the humorist, whether in Art or Literature, is one of the born instructors of his kind, and not the least efficient among them. Shrewd are the blows that he levels against vice, when it dares to come before him in its turpitude; keen the shaft aimed by his hand at the follies of the time, and unerring the touch wherewith he raises the veil of Pretention, whatever form the Protean goddess may assume.

If considered principally in reference to certain of his fables, La Fontaine may be justly classed among the humorists, and the grace as well as good-humor with which he laughs at follies that do not call for more severe repression, are admitted on all hands. Hear him, as he amuses himself with the dear little foiblesse of personal vanity, for example:

"Eh! bonjour! Monsieur *du* Corbeau!
Que vous êtes joli! que vous me semblez beau!
Sans mentir, si votre rumage,
Se rapporte à votre plumage,
Vous êtes le Phoenix des hôtes de ces bois!" &c.

We all know the rest, but how shall we render the charming playfulness of these lines? the "impayable" Monsieur *du* Corbeau? It is by no means to be done, the attempt is hopeless, but there is a dash-at-all Irishman of our acquaintace who would certainly not hesitate to give *his* version of the passage, and it would not be much unlike that in the note below;* for we won't admit it into the text. How the poor crow came to grief because of these sweet words, none will have forgotten. We all remember, too, the portraits taken of this Monsieur du Crow; there is room for another, nevertheless, and here is one, which, if it have no other merit, will at least serve us as the pretext for an exquisite morsel of woodland beauty, in the landscape you may limn for the habitat of your personages.

The fateful words have been spoken; they have produced their effect. Mr. Fox has caught the dainty prize before it has well touched the ground, and is taking his pleasant way along a sweet sun-lighted wood-path, his handsome brush sweeping with a proud complacency over the soft green turf. The figure of our bereaved O'Crow is much less triumphant; his amazement has not yet left him at leisure to close those musical lips that have worked his woe; and the aspect with which he regards his retreating despoiler is not a dignified one. On a high branch, far above the head of the crow, sits a saucy squirrel, eating his breakfast of nuts, with every appearance of satisfaction: he is bestowing the shells full upon the head of poor Sir Patrick; let us hope they are falling by accident, or it might be supposed that he was laughing at the evil plight of his neighbour.

All who love to contemplate beauty of form, and delight in the fervid tones of Italian color, will ever rejoice in the succesful transmission of both to their canvas by so many of our distinguished artists; but let not the Peasant of the Abruzzi, however picturesque his figure, nor the Contadina of the Campagna, radiant as is her glance, bear off all the honors of their notice.

A bright and glowing scene is the Wine-harvest, but it does not monopolize the poetry of the fields, and although much of the romance of rural labour in our own fair land has doubtless been destroyed, yet there still remain some lingering relics of old custom in remote districts, and these occasionally offer a spectacle not unworthy of the painter's eye.

In certain parts of Holderness, for example, the last load of the wheat-harvest is still brought home amidst songs of triumph, and with rude garlands of field flowers suspended from various parts of its huge mass. Boys, and the younger labourers, dance merrily beside the gaily decorated load; their exultation ever and anon bursting forth in the following words, which are used with slight variations, in all the villages where this primitive custom still lingers.

"We hev her! we hev her!†
Oor last cart's i tether,
Sae gin us a coo,
Or 'tis nobbut‡ a lamb,
For we see we coom seaf
Wi' oor harvest yam.§
At oor toon end, at oor toon end,
We've a soop o' good yal,¶ and we'eve mooney** to spend.
Sae coome big and little,
Sae coome yan and all,

* "And now there came, o'er the perturbed waves,
Loud-crashing, terrible, a sound that made
Either shore tremble, as if of a wind
Impetuous, from conflicting vapors sprung,
That 'gainst some forest driving all its might,
Plucks off the branches, beats them down, and hurls
Afar; then onward passing proudly sweeps
Its whirlwind rage, while beasts and shepherds fly."—CARY.

* "Now the top o' the morning! Sir Patrick O'Crow,
Faith! 'tis handsome you are! sure! the broth of a beau!
If you sing as you look,
We may seek high and low
But we'll not find your aqual, Sir Patrick O'Crow!" &c. &c.

† The attribution of the feminine gender to thing inanimate, in these regions, is sufficiently amusing. The clock, the oven, the kettle, and many another of the good wife's household belongings, are thus distinguished, her husband calling his watch "she" in like manner.

‡ 'Tis nobbut—if it be but.

§ Yam—home.

¶ Yal—ale. ** Mooney—money.

Ye'll get yal and get apples,
Whats'ever befall."

The "coo" is no longer expected, nor is even the lamb forthcoming in these degenerate days; but a gift of apples is made ready for the boys by every cottager before whose dwelling the auspicious procession takes its way. That the cereal aud floral games of the ancients have been the origin of the now dying customs, is manifest, but with this question we are not, for the moment, concerned. If the artist will admit that they may present subjects no less worthy of his pencil than the broad-fronted buffalo, and more fragrant load of southern climes, many a charming picture, never yet painted, may rejoice the eyes of the beholders, while it rescues from oblivion the last trace of national customs, now rapidly falling iuto disuse.

From a Georgic to Bucolics the transition is not violent, and here is a remark of that accomplished gentleman and eminent agrarian authority, the late Thomas Gisborne, which may give our iucipient Paul Potters rare occasiou for glorifying the never-changiug youth which their own chosen walk of Art may truly boast.

Gisborne, iu his Essays on Agricnlture, is descanting, with a most engaging geniality, on all that Mago the Carthaginian set forth, some good dozen of centuries since, as to the merits and attractions of a thoroughly handsome ox. These are the words of Mago, which Gisborne, loving his author for the sake of those lowing beauties, whose charms the Carthaginian chronicled so long ago, " will uot accept,' he tells us, " in the German of Heeren, or the English of Dickson," but renders them, aud to the letter, for himself. The translatiou is as follows:—

"The young oxen we buy should be square in their form, large limbed, with strong, lofty, dark-colored horns, broad curly fronts, rough ears, black eyes, lips promiuent, and expanded nostrils long and brawny neck, ample dewlaps, pendant nearly to the knees, a wide chest, large shoulders, roomy bellies, with well-bowed ribs; broad on the loin, with a straight, level, or even slightly depressed back; round buttocks, straight and firm legs, by no means weak iu the knee; large hoofs, very long and bushy tails: the body should be covered with thick short hair of a red or tawny color, and they should be very soft handlers." (" *Tactu corporis mollissimo.*")

' A very tidy ox ! " adds Mr. Gisborne, " whether purchased in Libya, by Mago the Carthaginian, six hundred years before Christ, or in our own good county of Northampton during this current year of 1852." He subsequeutly tells us that *his* Mago—for there were more than one of the name, as all will remember, discoursed thus eloquently, aud to the purpose, on beeves, iu the time of Darius Hystaspes, and was the founder of that great Punic family whence Hannibal claimed desceut.

Let, then, our young Paul Potters,—offering due allegiance also to Paul's worthy coutemporary, Cuyp,—take a goodly herd of such oxen as the Carthaginian has here depicted; let him give them to rove at will in such pastures as his heart best loveth to paint, and he shall cause the excellent Albert, nor less than dear Paul to smile approvingly as they give each other a cordial shake of the hand, in that bright painter's elysium, amidst whose fair broad uplands, fitly browsed by well-shaped flocks, they uow expatiate together.

Like Gisborne and the Carthaginian, a dear lover of all that peoples the field, the present writer has just taken couusel with another eminent " judge of fat cattle," to say nothing of lean, or of such as are neither fat nor lean—aud this authority likewise upholds the correctness of the Carthaginian model, save only in the article of horns, which as he sayeth,—should not be black, but white, seeing that the last-named color is now " your only wear." Let the student make his electiou, but in any case let him give us the cattle and their pasture; the horns he shall make of such color as may best please him.

" Gli occhi tuoi pagheran, se in vita vesti,
Di quel sangue ogni stilla un mar di planto."*—Tasso.

These words—their vengeful import intendend for the king, Louis XIII.—to whose ears they were quickly repeated by the enemies of the unhappy speaker, are declared to have burst from the lips of Eleonora Galigai, when the mangled corse of her husband, Concini, was laid before her. Whether Louis XIII. were thus menaced by the bereaved woman, in her frenzy, or not, the fate of Eleonora had certainly been decided on when that of Concini was determined; nor can this be doubted when we remember that the crime of which her venal judges pronounced her guilty, was that of witch-craft, an accusation manifestly iuvented, for their purpose, by the destroyers of her husband. For this she was condemned to the bitter death of the stake, and did in fact suffer on the Place de Grêve—but by the more merciful process of decapitatiou—some few weeks after the murder of Concinci.

More than one mournful story here awaits the hand of the painter; and if it be true that the grevious tragedies alluded to are already familiar to all readers, yet let the hand of the artist make them known to a yet wider circle of disciples, seeing that the lessons they convey are significant, and have proved useful to more classes than oue.

There may indeed be some who are still unacquaiuted with this deplorable episode of French history, and we therefore add the few words required to give its outline.

When Maria de Medici entered France as the bride of Henry IV., she was attended, among others, by Coucino Concini, whose father, origiually au obscure notary, was then high chaucellor to the first duke of Tuscany.† At the French court Concini married Elcnora Galigai, a womau whose origin was yet more humble than his own: she was indeed the daughter of a woodcutter and a washerwoman; but talents and qualities of various kinds had raised her from the conditiou of a menial to that of first lady of the bedchamber.

After the assassination of Henry IV., and when Maria de Medici was declared regent of the kingdom, this couple became the virtual rulers of France. But if Coucini did not find meaus to repress the disorders that prevailed, neither was he the origin or promoter of those disorders. The depravity in things public, so justly complained of, was not the cause; it was but the pretext of his downfall. The hatred of that party, at the head of which stood the Prince de Conde, whose instrument was De Luynes, the king's favorite, was not less ambitious than Concini himself, was the true source of the Italian's ruin. But we euter into no details: let it suffice to say that Concini—at this time known as the marshal D'Ancre—was murdered with the consent, nay, uuder the very eyes of the king, as he was entering the Louvre to wait on that unworthy mouarch; and that his wife, awakening from her dream of greatness, was conducted as above described, to a death— not merited very certainly for the crime it was declared to expiate—by the hands of the common executioner.

The few words by which Eleonora Concini repelled the accusation of sorcery, when standing on her mock trial before the Presidents of the Parliameut of Paris, are in the recollection of all, and need uo repetition. She left a son, not more than sixteen years old, and this boy, having been dragged by au infuriated mob to the windows of his devasted home, was compelled to look on while the body of his father, first laid hastily in a grave at St. Germain L'Auxerrois, but torn thence by the populace, was suspended on a gallows raised for that purpose. The life of the boy was saved, but not until he had been so roughly treated that every part of his clothing was torn to shreds. A cloak was then cast around the insensible youth by one of the spectators, more compassionate than the rest, who rescued him by declaring that he was already dead, and conveyed him, while yet unconscious, to the Louvre.

What follows will not be credited without difficulty; it is true, nevertheless, and may serve to show of what stuff was made that mistress for whom Concini offered the sacrifice of his life, for it is well kuown that he might easily have escaped to Italy after his danger had become obvious—had he been williug to abandon the queen to those who were her enemies no less than his own. The son of Eleonora, carefully educated in the luxuries court of France, was remarkable, among other accomplish-

* These lines may be translated—if not quite literally, yet with sufficient closeness, by the following:
"For each dear drop poured from his veins this day,
Thine eyes a sea of bitterest tears shall pay."

† See Litta, "Famiglie celebri Italiane," Roma, 1829.

ments, for the grace and beauty of his dancing: this was known to Maria de Medici, and, with the tears of sorrow for his parents still dimming his eyes, the terror he had so recently endured yet blanching his cheek, the hapless orphan was called on to exhibit his proficiency as a dancer for the amusement of the queen, and, with his breaking heart, was thus compelled to minister to the idle pleasures of her train. He died at Florence, in the year 1631, and with him perished the short-lived greatness of his house.

The death of Gustavus Adolphus, at the Battle of Lützen, has been amply discussed by writers, nor has it been wholly neglected by the painter; but there is still place for a fair delineation of that event, which yields in importance to few that occupy the historian, and has more than sufficient interest for the poet, whether painting or song be the muse of his invocation.

The great defender of the Protestant cause, and "one of the best men that ever wore a crown," Gustavus Adolphus, excelled in bravery, as in every other high and noble quality. At the Battle of Lützen he led the attack, and is indeed affirmed to have been the first who dealt a blow on that inauspicious day. He was heading a second charge, and had born down all before him, when the hand of treachery effected that to which the force of Austria had proved unequal. Francis Albert, Duke of Saxe-Lauenburg, the cousin of Gustavus, is accused of his murder by the concurrent testimony of his contemporaries. He was close to the king at the moment when a ball, coming from behind the latter, entered his back, and he fell dying from his horse. A German noble, the creature of Francis Albert, is said to have been also near Gustavus, and the traitorous shot has been attributed by some writers to his hand; but the author of that dark offence was, without doubt, the Duke of Saxe-Lauenburg whose subsequent defection from the Protestant cause and the welcome he received into the Austrian service, which he soon after entered, leave no doubt of his guilt.

That victory, nevertheless, remained with the Swedes, our readers will remember; this was due to the heroic efforts of Bernhard, duke of Saxe-Weimar. He dashed into the ranks of the enemy, calling on every true man to aid him in the rescue of their monarch, whom he declared to be a prisoner in the hands of the Austrians. The impetuosity of his attack proved irresistible, Austria was defeated with fearful slaughter, but, thanks to her treachery, the grieving Swedes bore only the lifeless remains of their beloved monarch from that dearly won field.

The painter who shall select this theme will treat it all the more justly as well as effectively if he adorn his canvas with the animated figure of Duke Bernhard. The omission of this would indeed be a violation of historic truth, as well as a mistake, whilst its introduction would supply the artist with a *point* in the composition, which, if successfully carried out, would, as we have just said, tell most effectively in a picture.

(*To be Continued.*)

From Notes & Queries.

THE APPLICATION OF PHOTOGRAPHY
To the Copying of Ancient Documents, Prints, Pictures, Coins, &c.

Several letters having lately appeared in *The Times* upon the above subject, which is one in which I have had considerable experience, I beg leave, in reply to several correspondents, to make the following observations.

I consider there is no difficulty whatever in obtaining a perfect fac-simile of nearly every ancient manuscript; and if the copy is to be made of one half or about three-fifths the size, then an entire book may be copied without in any way disturbing it; but in case of a transcript of the exact size, it is needful that great flatness of surface should be exhibited to the lens, and it would be required to pin or otherwise fix the object, that this state of even surface may be produced.

I do not meet with documents of the bright blue spoken of by Mr. Claudet or of the "gamboge yellow" to which my friend Professor Delamotte refers. It is true you occasionally meet with a brilliantly illuminated capital letter, into the composition of which burnished gold and cobalt blue enter; but then there is a sufficient difference for the tint of the vellum ground to make the photograph perfectly useful and beautiful at the same time. I may call to your recollection an entire page of a manuscript relating to Sussex which I perfectly copied about four years since, the original being in the possession of Mr. Durrant Cooper. In that early specimen there are many colours, and the result was most satisfactory. I believe that many of our best photographers fail from not using chemicals suitable for the purpose. The collodion adapted for the rapid production of a portrait from life is ill suited for a fac-simile, where length of time is of no consequence. I believe an old mixed collodion originally made sensitive with a compound of iodide and bromide of ammonium produces the most satisfactory results. But in general any old collodion is to be preferred to that recently mixed. All the fine lines in a delicate engraving, or the up-strokes of writing, become obliterated when a too rapidly acting collodion is used. I expose a light object, say a page of an ordinary printed book, when to be reduced one half in size, for about three minutes; but twelve or fifteen minutes will be required when the full size is to be accomplished, and a longer time still if the object copied is to be magnified. I presume that a single lens is being used. The double-combination lenses will succeed in half the above time; but then the surface covered in accurate definition of focus is comparatively small. When a single lens is used, no diaphragm is required beyond that usually used. But a double achromatic lens gives much greater roundness and beauty, provided the front lens is much stopped off by means of a diaphragm.

The picture is to be developed in the usual way, with a very weak solution of pyrogallic acid, and very freely dashed over the surface of the collodion, for otherwise stains will be produced from its having become more dry than ordinary, from the mere length of time employed since it was taken from the bath.

The picture being cleaned *perfectly* from the hypo, may have little of a negative character in it; but now by freely passing over it a portion, according to the size of your plate, of a mixture composed of 2 drachms of the bichloride of mercury, 2 drachms of chloride of ammonia, dissolved in 10 ounces of common water, a great change takes place, and a blueish tint will come over it. Wash it quickly and perfectly again, and pour over at once a solution of hyposulphite of soda, 5 grains to the ounce of water. The most intense black is now produced; and, the negative being washed and varnished as other negatives, the plate is finished, and is perfectly permanent, from which an unlimited number of positives can be taken, without any deterioration. In offering these remarks, I am well aware that, to all experienced photographers, they ought to be well known; but, as is evident from the correspondence which leads me to make this communication, success has not always attended their endeavours. In conclusion, let me add, that this process is applicable to the production of photographic copies, not merely of MSS. on vellum and paper, but of engravings, medals, seals, oil-paintings, and, in short, of all similar objects. Any of your antiquarian readers, possessing objects of interest, of which they may desire copies, I shall be happy at all times to advise as to the most ready means of accomplishing their wishes.

Hugh W. Diamond.

[This valuable communication from Dr. Diamond, the importance of which can hardly be exaggerated, was accompanied by a photograph, representing on one sheet copies of four documents of very different dates and condition, both as respects the color of the parchments, and the fading of the ink—all taken at the same time. The first is of the date of Henry VII.; the second of Henry VIII.; the third of Edward VI. (the parchment of which is as dark a brown as parchment can well be); the last is a document dated in the reign of Elizabeth. Nothing can be more perfect than these copies. It is almost difficult to believe that they are copies, and not original documents. But that our readers may form their own judgment on this point, the photograph is left for inspection at the office in Fleet Street.

Since the above was written, we have received a note from

Dr. Diamond, announcing that he has just made a most successful copy of a page of MS., in which the red, gold, and blue are all of the proper degree of tint—Ed. "N. & Q."]

THE ART PUBLICATIONS OF MM. GOUPIL, OF PARIS.*

Too long a period has elapsed since we directed the attention of our readers to the high class engravings issued in Europe; yet they have been exercising considerable influence, not only among the people for whom they are more especially published, but in America, where very large numbers of foreign works circulate, and where they are undoubtedly, for the most part, productive of great good. We refer, not so much to the number of colored lithographs, which find their way into all quarters, because of the small cost at which they are sold, as to that higher order of works, of which our issues in this country are few and far between; yet even of the former we may speak with respect, for they teach while they give pleasure: and it is sufficiently notorious that in the particular class to which we more immediately allude, our American artists are deficient: or at all events they abstain from sending forth to the world those "studies" of form and feature for which we are indebted to our neighbours of France. Our observations, however, mainly apply to those engravings of the higher order of Art—line engravings—which of late years rarely appear as the issues of American houses: and our supply of which, now-a-days, chiefly come to us from Europe. Engraving in line seems, in truth, to have been for some time declining in this country; from the labour, and consequent expense, necessary to produce a line engraving, it is rarely that as a speculation a work of that class is found to answer: at present, we believe, there are not a dozen works of this order in progress throughout America.

Under such circumstances, it is not to be wondered at that we resort to Europe for our supply; and it is certain that the establisment under notice gives us that supply in the largest proportion, and of the greatest merit. During a recent visit to Paris, one of our principle enjoyments was derived from a visit to this renowned house; and it is that to which, at present, we propose to direct the attention of our readers. The house of M. M. Goupil was founded in 1827; it has now a branch at Berlin, and another in New York; and its "correspondence" extends over every kingdom and state in the old and new world; in America especially they may be said to have *introduced* Art, for previously, the importation of prints was very confined, and its native produce little or nothing; a taste for Art has so largely grown "by what it feeds on," that now the United States rank among the best encouragers of fine Art, and its wealthy citizens are the most liberal buyers of first class proofs. This advantage is naturally participated in by England; but it is undoubtedly the consequence of the exertions of MM. Goupil. Some idea may be formed on this from the fact that, according to M. Goupil's report, the sales they effected here in 1848, amounted in value to 140,000 francs; in 1854 it had reached the very large sum of 569,000 francs.

A sum of nearly $500,000, is annually expended by this house in the production of engravings, and MM. Goupil give employment to all the best engravers of France; attracting also to their establishment many of the leading artists of the other continental states; while a natural prominence is given to the works of the French school of painting, their catalogue includes engravings from the most famous productions of the ancient masters —Raphael, Michael Angelo, Titian, Murillo, Paul Verouese, &c. &c.

To examine, in anything like detail, their catalogue of published engravings, would be to occupy a part instead of a page of this Journal. That catalogue is a large book, containing the names of several thousand prints, a great proportion being of the cheap order, but very many of them holding rank among the highest acheivements of the age in Art; and, indeed maintaining a just claim to be placed at the head of those productions of the burin, which extend the fame, give currency to the genius, and circulate the teachings, of the painter.

A few of the works of this order we propose to bring under the notice of our readers. First is that famous print "The Hemicycle ," of the Palais des Beaux Arts,—the great master works of the great artist, Paul de la Roche; engraved by a worthy associate, Heuriquel Dupont. The picture is almost as well known in England as in France, for it is one of the lions of Paris, which no Englishman ever fails to visit. To describe it is needless; the accomplished engraver has made it common property; for all its worth excepting color, is conveyed by the burin; and, although of large size, it is issued at so comparatively small a price as to be within the reach of ordinary purchasers.

The list of M. Goupil contains a very large number of works after Paul de la Roche; they are in various styles—all extending the renown of the great painter, and bringing to his *atelier* the homage of those who love and appreciate the excellent in Art of every country of the world; his illustrations of History are familiar: "Stafford going to Execution; " "Charles the First in the Guard-house," The Children in the Tower;" and other passages from English historians, have long been the favourites of our drawing-rooms: while holier thoughts and loftier inspirations are excited by the "Saint Amelie," the "Virgin Mother," and "The Entombment," and the best of our home sympathies are moved by that exquisitely touching composition "Les Joies d'une Merè," and others of its beautiful class: portrait-history being, as it were, consecrated by such works as those of "Napoleon Crossing the Alps," and "Napoleon at Fontainbleau." These grand prints, upon which we cannot find space to enlarge, bear the names of Dupont, Martinet, Mercury, François and Forster, as engravers.

The paintings of Scheffer have naturally been largely multiplied by MM. Goupil; perhaps no living master has so much influenced the heart as this true master; his "Christus Consolator," engraved by Henriquel Dupont, is the cherished guest of many American homes; its companion, "Christus Remunerator," (engraved by Blanchard) is only its second in public favour; while such works as "The Holy Woman at the Tomb," convey the lessons of Art as pure and holy missionaries of Christianity. For giving these admirable and very beautiful productions to the world, the public incurs a debt to the publisher scarcely less than that they owe to the artist.

These are not the only great artists of the French school, whose loftier imaginative works MM. Goupil have multiplied; although these famous painters have obtained a popularity in England which very few of her own artists have acheived; their popularity indeed argues well for our own advanced and impoved taste; the circulation of such publications cannot be too wide; it may, in a degree, humble us, in our own self-esteem, when we call to mind the enormous sums lavished in this country—idly or worse—upon multiplications of dogs and horses. But there is, happily, an ample " public" for a better order of things; and we cannot doubt that, if our publishers would dare the higher aspirations of Art, they would "find their account" in them—and not allow the publishers of France to obtain all the glories that are to be derived from the pure and true in Art.

It is not to be supposed, however, that MM. Goupil have not ministered to the taste of the multitude in their publications. To say nothing of the thousands of colored prints, in mezzotint, in aqua-tinta, and in lithography ;—comprising war scenes, fair faces, landscapes, seascapes, costumes, foreign incidents and characters; objects of Art, industry, portraits of great men(dead and living), flower-pieces, studies of ornament, pictures of famous cities; in short, every topic that can be made available by Art to impart pleasure or to convey knowledge, has found a circulation to all classes through the means of these eminent and extensive publishers. And in thus endeavouring to make their works and themselves even better known than they are in Amercia, we discharge one of the pleasantest, as well as the most imperative, duties of the editor.

* [We have taken the liberty of altering this article from the *London Art Journal* to suit this latitude, as we consider it equally pertinent to this country as England.—Ed. P. & F. A, Jour.]

From the Journal of the Photographic Society.

To the Editor of the Photographic Journal.

Sir,—Although my great distance from England prevents my becoming a member of your Society, yet the interest I take in its welfare induces me to add my mite to the furtherance, in any way, of the beautiful art we delight in. That Mr. Shadbolt's simple and effective plan for preserving the sensibility of the collodion plate is a great boon to photographers, every one who has tried the process will admit; but still there are many who, although aware of the fact that a plate can be kept sensitive for a long time, are at a loss for a means of carrying out these plates, and changing them in the open air, without a great number of dark slides. By the following means I have prepared overnight a dozen plates; starting early the next morning on a photographic ramble, and returning at night to develope my plates at my leisure. I have had a light box made, into which my camera exactly fits, and in which I carry it; placing a box of prepared plates inside the camera. This box (the one first mentioned) has a small square of yellow glass inserted in the centre of the top; also a similar one in the centre of the front. It has also at each end a round hole, cut large enough to admit the arm freely; to each of these holes is attached a sleeve of black velvet, ending with an elastic band. The yellow glass windows must be protected, when not in use, by shutters sliding in grooves; so may also the holes at the ends, by pushing in the sleeves and sliding shutters over them. I will now suppose I have exposed a plate, and wish to change it. The camera being out of the box I place in it (*i. e.* the box) the box of prepared plates; also the slide. Now placing my arms through the holes, or rather sleeves, at each end, and bringing the elastic bands round them, by looking through the top yellow glass, and being aided by the light from the front one, I open both slide and plate box, put the exposed plate from the slide to the plate box, and another to be exposed from the plate box to the slide; then closing both plate box and slide, the second plate is ready for exposure. It will be perceived at once that this plan is equally applicable to the paper process, by substituting a folio of sensitive paper for the plate box.

I am, Sir, your obedient servant, Edwin Haviland.

Personal & Art Intelligence.

— We must again be permitted to open our editorial columns this month, by answering, in a general way, the various complaints of those who do not succeed in getting their numbers regularly, if at all. We can only plead guilty to the lateness of our issues for the past three months. The reasons for this we have already stated; but we can assure our subscribers that every number is regularly mailed with all the accuracy it is possible to observe, and we can assert, of a certainty, to those who fail to get them from mouth to mouth, that the fault can only be in the miserable manner in which the postal arrangements are conducted, and we have no doubt that there are more thieves in the various post offices throughout the country than ever existed at any time before within the memory of man. We must also further say that if all offices are managed as badly as that of this city, we cannot be surprised at anything that may take place in them. We shall make every effort in our power to correct the evil, but we shall have little hope until the people, generally, take the right step towards teaching their servants common honesty.

— The Revue Photographique, published in Paris, thus speaks of Mr. Mascher and his article on "Daguerreotypes without a Camera," which we published a short time since,—

"He is truly an extraordinary man, that Mascher! He cries, a miracle! a miracle! And what for? Why, because he has seen the image of objects placed before a camera obscura, (having no object-glass, but pierced with a small aperture of a diameter equal to that of the human eye) depicted clearly upon a glass fitted in the bottom of the camera, just as though the primitive camera obscura of Porta was not a single window-shutter pierced with a small aperture. He was on the point of fainting when he proved that the rays which had traversed these small apertures of a millimetre or the fraction of a millimetre in diameter, kept their photogenic properties and gave him, after 50 minutes exposition, a beautiful daguerrean proof. Lastly, he felt himself transported to the third Heavens, when in the bosom of a similar camera having two apertures separated by a distance equal to that of the two human eyes, the luminous rays were so condescending as to delineate on the metallic plate two stereoscopic images. On the announcement of this unutterable discovery of Mr. Mascher, America throughout its entire length and breadth, raised one mighty triumphant cry. Brother Johnathan clothed himself in his glory and darted across the ocean a look of the superbest disdain. Stereoscopic pictures obtained without lenses! was the grand theme and order of the day, and was sung in every key. Even the *Scientific American*, ordinarily much the best informed, and generally very skilful in defending itself from the ducks who quack at its heels, was himself taken in the trap. Little was wanting to have caused a general crusade to have been preached against object glasses, and to have brought us back to the birthday of the art, to those good old times, when to obtain a daguerrean proof we had to arm ourselves with such superhuman patience."

We have seen many little morceaux in the French Journals similar in character to this, but none which so truly and strongly shows the meanness of mind, and the perfect egotistic arrogance of style in which French writers indulge, in noticing discoveries and improvements in photography in America. Possessing not a particle of that generosity of nature which is so common among their English neighbors, they are naturally unwilling to give Americans credit for their acknowledged ability as photographers, but they seize every opportunity to vilify as well as ridicule the theories and practice of our manipulators and experimentalists. Added to this there is a maliciousness about this paragraph entirely uncalled for by any statement of Mr. Mascher in the article to which it alludes, and the very meanness of the French editor places him in the most contemptible light; and in order to enhance this fully he does not hesitate to utter falsehoods. It is true Porta was the means of the discovery of the camera, but did he ever produce the same effect with the hole in his window shutter that the photographer of the present day does with his camera, or even that Mr. Mascher did with his pin holes? Can this wise (?) French writer point with truth to any prior experiment of like nature to that of Mr. Mascher? We have heard a great deal said about French photographs, but when Frenchmen can produce such pure unretouched photographs as those of Turner, Hesler, Root, and others of this country, it will then, and then only, be the time for them to endeavor to cast ridicule upon the efforts at improvement in this country. In photography, as well as all other branches of art and manufactures the French are very good in making a tinsel show, but in the really substantially useful things of life, they are mere dabsters, as has been recently proved by their own "Palais de l'Industrie." While we accord to a few of her savans all the praise justly their due in Photographic discoveries, we must express the opinion that such small fry as the writer of this phillipic against Mr. Mascher, only disgrace the cloth, and are totally unfit, both from shallow understanding and absurd arrogance to conduct a Journal of the otherwise respectable character of "*La Revue Photographique.*"

— Richard Perry.—The only delay in the issue of Mr. Root's work on Ambrotyping is caused by himself. We trust, however, that it will see the light before long, and that we shall be able to fill the many orders we have received for it. We think you have not examined "*Hardwick's Manual*" very thoroughly, for you are mistaken in his not giving formulas for practical manipulations. We know of no work more full or explicit.

— W. H. Thomas.—We should judge that you had made a discovery, but, of course, shall have to wait for new developments before expressing an opinion. Do not suffer your bashfulness to deter you from making it known. Delays in this fast age are dangerous. You must have patience with us, we shall soon have everything right, and give you the Journal promptly.

— H. Marshall.—We are sorry to say that since we last

wrote you the owner of the view tube has declined selling it, it has proved so useful to him since in his photographic practice. Mr. Harrison, however, will make one for you, at the regular price, and warrant it.

— C. Dart.—We have been laboring for the last seven years to convince our Photographers of the utility of the principle you suggest; but with few exceptions, our labor has been in vain. We yet hope for better things. Your anecdote is such a good illustration of the subject that you must pardon us for giving it here. "A daguerrean 'had a call' for a picture. After sitting his customer he produced the proof, remarking upon its excellence, 'But,' said the sitter, 'but what's the price?' 'One dollar,' says the artist. 'But, but,' returns the customer, 'Where, oh! where are my eyes? Are they gone, and am I blind?' 'Well,' the artist replies, 'I don't see any use in making sich a plaguey fuss about eyes; they are of small consequence. I'll throw off twenty-five cents, and that ought to make all right.'"

— Barnard & Nichols.—The photographs sent are deserving of high praise, particularly in softness of tone and the artistic arrangement of light and shade. Since we received them we had the pleasure of a letter from a friend, who in passing through Syracuse, called at your gallery and examined your pictures. He praises them highly, and says that your colored portraits are not only beautifully colored, but superior in expression, and more life-like than any he had ever seen before. We are looking very impatiently for the promised contributions.

— M. Sutton.—We are always pleased to meet the wishes and wants of all who desire our aid in any matter connected with the Art. We are pleased to learn also that you have made so excellent a selection. As a daguerreotypist, Mr. Weeks stands high, and we know him to be a gentleman in mind and manner. We have heard great praise bestowed upon the photographs of Mr. Sutton, and our friends Gurney and Fredericks will have to try again in order to carry off the palm in large and exquisitely colored photographs, as Mr. Sutton has just finished one containing twenty-five full length pictures, for which he is to receive $800,00. Another lately finished sold for $600,00. Such evidences of enterprise in the Art, and of appreciation of the artist in the Western country should put New York to the blush.

— The following extract from a letter gives evidence of a system too much in vogue at the present day among daguerreans, and we are astonished that so many fall a prey to it, and that so many, very little capable of giving instruction, make money out of it. We do not object to the system itself, when conducted by those competent to the task, but to the swindling operations carried on under it.

We are fearful that it will be a long time before the suggestions of our correspondent will claim attention.

"You have never seen such a flood of men as are scudding the country round, offering to teach the Ambrotype process. You would be perfectly astonished to hear them talk. They teach Messrs. Root and Cook's process, which is better by all odds than any other. Then comes Mr. Cutting's man, who claims that no person dare teach the true art but himself. Then comes a Dr. Somebody, who had them all, and teaches Mr. Farris' work as being far ahead. Then Mr. Humbug sends word that for $100, and the payment of his expenses to and fro, you may be taught by himself personally, but by remitting $5,00 he will send you a small book, and by it teach more than by employing those who do not know how to teach. Why don't you expose the system; it is cutting at the root of all generous feeling, and I am sure that there is less fraternal feeling among the artists in the country than in any other calling. Now it is all wrong; I hope you do not feel the same towards each other in the city. You are continually asking those who are able and competent to write their experience—their working experience—but do you suppose they will do it? Just look at our Journal, (I call the Photographic and Fine Art Journal ours, for you don't take more interest in it than I feel for it,) and the Journal of the London Photographic Society; there everybody tries to help it along and explain their work, so that as soon as one member falls on something new or of interest it is communicated to the Journal that the rest may have the benefit in return for what he has received. But how is it here? Instead of being the means of inter-communication between ourselves—for self-improvement—it is to get all you can out of the editor for the five dollars, and see a notice of our work once in a while. You ought to cry shame on them! Why don't Tomlinson give his process; he would not loose by it.—N. G. Burgess, and lots of others who take first-class pictures and have had great experience, they would not loose one cent by it, and see how it would help the Journal. Pray excuse this long scrawl, and believe me, Yours, truly, J. J. B.

— Messrs. Meade & Bro. of this city have introduced a new application of Photography into their establishment; that of taking photographic impressions on silk; and so fixing the colors that they cannot be removed by any ordinary process of washing. The specimens of this kind of work shown are admirable. Your portrait may be put upon your pocket handkerchief or your hat lining or where you will; it will stand all weathers and will wear as long as the fabric on which it appears. The variety of uses, in getting up badges, etc., to which the process may be applied, is almost endless—it may prove one step towards substituting the daguerreotypic art for that of steel plate in producing copies of fine paintings.

— Messrs. Minnis & Tanner of Lynchburgh have dissolved partnership and the buisness is now carried on by Mr. Tanner.

— A trial took place in the French courts last week, which has its interest for many of our readers, and the result of which should set such of our artists as have pictures in Paris in the Universal Exhibition on the watch. To our astonishment, it was desided (if we truly comprehend the bearing of the decision pronounced) that a man may photograph any picture on the walls of the Exhibition with or without the consent of the painter! Here is the case, as reported in the papers:—M. Muler, the artist, brought an action against M. Disderi, Director of the Photographic Society of Paris, to obtain payment of 500 francs for having published a photographic production of his large planting in the Exhibition, entitled "Vive l'Empereur? 30 Mars, 1814!"—the photograph is not only taken, but is published. Where is the substantial differeuce between such a violation of M. Muler's copyright, and the theft of an engraver? We see none. The Court, however, thought otherwise. M. Disderi objected to the claim, on the ground that he had made no promise to pay any thing, and that the most eminent artists who had exhibited had allowed him to produce photogaphs of their works without payment. The tribunal, finding that M. Muler could not prove that any promise of payment had been made, and considering that the photographic reproduction of a painting is calculated, to make the work widely known, to the benefit the artist, declared the demand unfounded, and dismissed it, with costs. A more extraordinary verdict is probably not on record. The reason is as strange as the decision, and will apply, as it seems to us, to the engraver as clearly as to the photographer. The engraver makes the picture more widely known; the literary pirate also makes a book more widely known. But we never heard before that this circumstance justified piracy. Our own artists, we believe, will seriously object to any application of this French license to the copying of their works, to be followed by photographic publication in Paris.

— We accidentally saw announced for publication "Messrs. Cook & Root's Ambrotype Process," and we take the earliest moment to caution photographers against the spurious affair, as it is only got up to deceive. An honest man would not be guilty of so rascally a transaction. The work about to be published by Mr. Root is entirely original with him, and as it has not yet seen the light our readers will see the imposibillity of any other person being able to publish it.

— We had the pleasure last evening, March 18th, of attending a levee, at the residence of Mr. Thorpe, 154 Eighteenth-st.,

given to the young ladies, pupils of the "School of Design for Women," and were delighted with the exhibitions of drawings, and more than all the bright, beaming faces of the young artists. Mr. Thorpe threw open his elegant mansion for the reception of his young guests, and the evening passed away amid music and mirth.

The Rev. Mr. Bellows made an eloquent address upon the beauties of art, and it was listened to with almost breathless attention by the young auditors, who, arranged in a circle around him, seemed to imbibe inspiration and energy from his eloquence.

Mr. H. W. Herrick responded. He is the practical teacher of the school. We hope to see many of these social meetings. They serve to encourage the youthful aspirant (especially the female portion of the community) who, not fitted for more menial employments, and having refined tastes, turn their attention to what can at the same time be a source of pleasure and of profit. Many of the specimens of wood engraving were very beautiful, particularly one—we suppose original—of Eva, from "Uncle Tom's Cabin." The expression of the childs face is almost angelic, as with lifted arm, she exclaims, "Uncle Tom, I shall soon be there!"

We hope to see the example of Mr. Thorpe followed by others who love to encourage genius, and aid those who are struggling for independence. Call them together and enliven their wearisome hours of toil with cheerful recreation.

— In the "Cour Imperiale de Paris (Appels Correctionels)," we perceive that certain photographers, some of whose works have reached this country, have been getting into a peck of trouble. It appears that complaints having been made to the police against *certain* photographic prints, which capped the climax of indecency, proceedings were instituted against Mr. Delarue of Montmaitre, from whose establishment the precious works eminated. Mr. D was arrested, and upon his examination declared that he published the prints for a firm to which he belonged and to which one Trableue de Caudie contributed the capital, the latter gentleman having lived long in Russia, and expecting to find a ready sale for such effusions in that benighted land. Warrants were at once issued and enforced against Trablene, Victor Roger, a photographer who had aided in taking the pictures, and one Justice (styling himself a laborer by occupation) who indeed could not well deny his participation, since he frequently figured in too many questionable (or rather *un*questionable) scenes perpetrated by his photographic employers.

The Tribunal Correctionale of La Seine condemned Delarue, Trablene, and Roger, each to a fine of one thousand francs and to one years imprisonment, and sentenced Justice to a fine of one hundred francs and two months imprisonment. All of these defendants appealed to the Cour Imperiale, and this tribunal heard their appeal on the 4th and 5th of January, 1856; after due consideration the sentences of Delarue and Trablene were confirmed. Roger's imprisonment was reduced to six months, and that of Justice was *extended to eight* months.

It is better for the photographic and moral world that this affair should have been so well *developed*, and the gentlemen concerned so well *fixed*. Mr. Justice appears to have injured his proof by pushing his development too far—better have let it alone as it stood at first. Matters would have seemed more consonant with our ideas of justice if some enquiries had been made about *the ladies* whose charms (?) form the staple of this villainous merchandize; but such a thing would never do in "La Belle France," where the frail ones of the sex are protected by letters patent and licenses.

— The Photographs in this and the preceding number were varnished with a new article invented by Mr. Anthony (of whom it may be obtained). Besides the advantage it possesses over all others, in being free from a glossy reflection, it has the power to strengthen the shadows and bring out to view those delicate shades previously invisible to the naked eye. This effect is quite remarkable. Mr. Anthony has also recently introduced a new transparent varnish (of his own invention) which he calls "Diamond Varnish," which is superior for Ambrotypes; and a "Crystaline Cement," which is decidedly better than balsam of fir for sealing glasses together, as it is not so liable to get yellow or crack. We can recommend all these varnishes from actual experience. The quality of the photographic varnish is fully apparent in our illustrations.

— As we find it impossible to recover—under present circumstances—our lost time and furnish two Photographs this month, we have thought best to omit one so as to enable us to get out the May number at the proper time. Our trouble is want of a sufficient number of negatives.

— As we have considerable money to pay during the next month, we shall feel obliged to all our subscribers, who have not yet paid this years' subscription, if they will remit immediately.

NEW PUBLICATIONS.

Five Hundred Mistakes of daily occurence in Writing, Speaking, and Pronouncing the English language, corrected. New York: D. Burgess & Co., 60 John Street.

This is a work of practical character, and great value. We have rarely seen so great an amount of indispensable information presented in so small a compass, and in so attractive a manner. It does not enter into the minute details of English grammer, but being designed for the instruction and profit of persons of ordinary education, it strikes at once at the root of their usual difficultics in speaking and writing, by correcting their common and habitual blunders. It takes up *five hundred* mistakes, such as may be detected in the conversation of multitudes of people, and explains and corrects them in a striking and pleasant style, which makes quick and deep impression on the memory of the reader. It sets a guard at the gate of the lips, and allows only such words to pass as are legal to the King's English. The book abounds in humorous illustrative anecdotes, and will be read with no less entertainment than instruction. Price, 37½ cents; single copies sent by mail (postage paid) to any address at a distance from the city.

The Ambrotype and Photographic Instructor; or, Photography on Glass and Paper; by M. H. Ellis, M. Shew, Philadelphia: 1vol. 18mo. Price $1,00.

A fair compilation from standard authors.

The Alcoholic Controversy; A Review of the Westminster "Review" on the Physiological errors of Tetotalism; by R. T. Thrall. Fowlers & Wells. 1 vol. 18 mo.

The subject of alcohol as a beverage is ably treated in this little work.

"The Inventor," for March (in advance of date), published by Low, Haskell & Co., solicitors of Patents, 271 Broadway, New York. $1,00 per annum.

This highly interesting and valuable monthly (still in its infancy) is destined to accomplish wonders for the objects to which it is devoted—encouraging and promoting new discoveries, and disseminating a thorough knowledge of correct principles in Mechanics, Agriculture, the Arts and Sciences, and industrial pursuits generally. Each number is beautifully and profusely embellished with engravings illustrating the subjects treated of in the text. The clear, vigorous, comprehensive, and scientific style,—as well as the amount, character, and variety of its matter, bears unmistakable evidence of master minds wielding the pen in the editorial department. This periodical fills a niche hitherto unoccupied in the literature of the day, and meets a want which has been long and sorely felt by the inventors of our country. In but too many instances, the poor inventor, lacking the means necessary to properly place his discovery before the public, has become the prey of designing knaves, and by them wronged out of the fruits of his brain, and years of laborious struggle. This class is now guarded against duplicity and fraud, by the establishment of an office connected with this publication, for the transaction of business with the patent office at Washington.

"The Inventor" is neatly gotten-up, is beautifully printed, and the subscription price ($1 per annum) places it within the reach of all. The success it has hitherto met with, is a guarantee of its sterling worth.

Negative by Meade Bros

PALAIS DE L'INDUSTRIE.—EXTERIOR VIEW.

From the London Art-Journal.

SUGGESTIONS OF SUBJECT TO THE STUDENT IN ART.*

BY AN OLD TRAVELLER.

CHAPTER II.

The Sculptors in Council—Agesander and his Sons, Athenodoros and Polycrates—Imelda Lambertazzi—The Brothers' Visit—The Lady's Dwarf—"In their death they were not divided"—Vienna and her Lovers—Friendly criticism of a learned German—Our "Brandy-Maidens"—Prague and its Painters—Sigismund's Safe-conduct—The Martyr's Friends—Frederick of the Palatinate—The Winter King's Banquet—Bohemian Critics in Art—Sculptured Galleries of the Vatican—The Nile and his Children—Barks of the Pigmies—The One Fault of our Mother-land—"Floreat Etona"—Hal has Come!—John of England—The King's Justice—Alice will not Marry—Sculptor or Painter—Giorgione to the Rescue!—Egeria—The Camœna Listening—The Nymph in Sorrow—Hippolytus and the Dryads—Approach of Artemis—Consolation and Deliverance.

MORE frequently should those, who *now* uphold the empire of Art, be found offering homage to the glories of their Great *departed.* All honour to the artist—worthy of the name—who devotes peucil or chisel to the memory of the mighty dead, and who gives to these later times the form, the face, the living presence of one who has illumined the past.

Have we then a painter or a sculptor who can do this worthily, as regards him to whom the whole broad world is debtor for one of its richest treasures in Art?—"as regards *them*"—perhaps, we should say, since it is of the creator of the Laocoon, of Agesander, and of his sons Athenodoros and Polycrates,† that we speak.

The sublime master and the sons who have not degenerated from such a sire—contemplating the well-nigh completed work that was to bear their names triumphantly through all time—surely these may form a company well fitted to occupy the nights and days of one whose soul, vowed to Art, can worship only in the presence of her highest manifestations; and we know that we have among us some who feel that they may aspire to treat such themes.

It is to the Sculptor that this grand and glorious Council of Sculptors would seem of right to belong, and even at this moment who shall say that its reproductiou is not in the heart of one, who does but wait until he shall find such marble as he can hold to be pure enough for so lofty a work! Let the day come! but, meanwhile, we are content to accept the life-giving canvas. See only that it bear the magnificent forms of those immortal sculptors; let us have their noble heads, with the light of his genius irradiating each brow, and all praise to the painter who shall enrich the coming ages with a gift so valuable.

Few cities, even of romance-inspiriug Italy, present a richer abundance of picturesque memories than does Bologna. And among these, the well-authenticated story of Imelda Lambertazzi might commend itself to the student of pictorial effect, with a force of appeal scarcely inferior to that of her who has made of Verona, a shrine for the pilgrim of Art in all ages: but where hath been the bard to chronicle its details? "And Echo answers, where?" The history of Imelda would seem to have lain concealed beneath that dust, which ever accumulates over the mere dry annalist; or, if touched on by more attractive authors, it has been so slightly, as to awaken no responsive chord in the great heart of the masses; neither will the simple mention of its unhappy close, to which our present purpose confines us, be more than the driest detail of facts;‡ yet from these may the painter assuredly derive some matter for his musings.

Imelda Lambertazzi was a daughter of that family, whose then chief was the head of the Ghibelline faction in Bologna, yet she had met, and fatally been taught to love by the young Bonifazio Geremei, whose noble house stood paramount among the most zealous of the Guelphic party. A secret marriage had united the lovers; but their stolen meetings were betrayed to the family of Imelda by the treachery of one she trusted; and her brothers, forcing their way into her apartments, attacked the unarmed Geremei with their daggers. Declariug to their sister that their weapons were poisoned, they thus sought to deter the unhappy lady from placing her own slight form between themselves and their victim. But the warning proved vain. Imelda threw herself before her husband, and is supposed to have received some injury from the poisoned daggers. Be this as it may, Geremei was despatched, and his body was dragged to a distant part of the palace, where the murderers left it in a vaulted chamber, there to await some more convenient season for burial.

They had been followed by a dwarf in the service of Imelda; and this poor creature, returning to his mistress with tidings of the place where her husbauds's corpse was laid, conducted her to the vault, when the means by which Eleanor of Castille is popularly, but erroneously, said to have saved the life of our own Edward I. in the Holy Land, were eagerly adopted by the unfortunate Imelda. And her happy husband did awake to consciousness; but it was only to acquire the certainty that his wife had sacrificed herself in the vain hope of saving him. The poison she had imbibed, aided, perhaps, by that received from the weapons of her brothers, had already begun to produce its effect; and the priest, who had performed their marriage rite, sought by the faithful dwarf, could but arrive in time to discover the pair so fondly united in their lives, thus dying together. From his hands they received the consolations of religion; and the last sigh of Geremei was exhaled in a blessing on the wife who had so dearly proved her faith. The feeble arms of the expiring Imelda were then twined around her insensible lord,—both happy, at least, in that they were delivered from the pains of separation by the pitying hand of death.

More than one of Imelda's compatriots, with whom these incidents have been discussed, in the city of her abode, have pointed out moments in the same, well calculated to attract the notice of the painter. These have varied as differed the tastes and feelings of the speakers; but all have agreed that many pictures were to be found in the story; their selection and treatment we leave to the artist.

"Rich and rare," without doubt, are the attractions of the Austrian capital; yet they have, for the most part, received their full meed of praise, and in some instances have been lauded much beyond their deserts. Vienna *is* a brilliant city, nevertheless, and "*abstraction faite*" of all the exaggerated eulogies bestowed on her by the more ardent of her lovers. Fair collectious in Art enrich the princely palaces of her great nobles; and the courtesy with which these are offered to the inspection of the foreign guests, is no slight addition to the pleasure they convey.

Revisiting one of the most important of these collections, after the lapse of some years, the present writer listened, with pride and gratification, to the admiration expressed for the Galleries of our own high Magnates, by one whose fiat is, in such matters, held to be conclusive. But the remarks of the same speaker, on our periodical exhibitions—those of the Royal Academy aud other institutions, that is to say—although pleasing in the main, were, in certain respects, less flattering to the English ears of his auditor, while the impression they made was all the more lasting, from the known disposition of the reluctant censor to see every thing produced by England *en beau.* The undeniable justice of these friendly strictures gave them added force. Let us try if we cannot profit by them.

"Why will so many of your really clever painters give themselves to the delineation of fat red boys eating what you call *the dompling*, or to that of your 'brandy-maidens' *et id genus omne*?" quoth my colloquist, not exactly familiar with our idiom, but coming, nevertheless, very near the true character of the subjects deprecated.

"You would surely not prohibit incidents of ordinary life?"

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* Continued from page 92.

† Called also Polydoros.

‡ The writer thinks it possible that some mention of Imelda Lambertazzi, may be made in Roger's "Italy," but has not the book at hand to ascertain the truth of this conjecture.

returned his interlocutor, knowing well that he had no snch desire, but unprepared at the moment with any better defence.

"Certainly not; but neither will I permit them to push all other incidents from their stools," was the smiling rejoinder. "Here have I been delighting myself with the many great and excellent qualities exhibited by your artists in the ——, and the ——, and the ——" he exclaimed, in continuance, running over the names of some half-dozen among our exhibitions of that year, "but in every one I find more or less cause to regret the predominance of the subjects in question, while you neglect another class of themes, to which no school of painters could do more effectual justice than your own."

"I do not mean the Grand Historical," he continued, referring to a remark he had been previously making, "but rather to what we will, if you please, call the Domestic History of Nations. And I ask you if your annals are not amply rich in events of interest worthy to be commemorated?" They are, without doubt. And the earnest speaker rapidly adduced several more or less familiar incidents from our history, in proof of his assertion. "Is it, then, that your artists do not read, or must we suppose that the brandy-girl appeals with more success to your national tastes? Ah! it is *not* brandy she wills to give you!—perhaps not; but do not let us split straws (this in reply to a most stupid attempt at explanation on the part of his companion—mine unworthy self, *videlicet.*) I grant you, tco, that she is piquante and pretty, that sherry-girl, since you say I must not call her a brandy maiden, she does veritably offer 'an excuse for the glass,'* as your good comedy has it; but your able artists should more frequently do themselves the justice of handling higher themes. You have seen the exhibition at —— this year, I know, and at ——, and at ——, and I think also at ——?" And my interrogator enumerated certain continental cities, *not of the first class*, whose academies he had recently visited. It was true, I had seen them all, but of the exhibition in the last-mentioned, I insisted that it was not worthy to be named with the least meritorions of our own.

To this my friend agreed; but he added, "It is for that very reason I cite it, since *even there* I ask you if you did not see a class of subjects, whereon the genius of your artists would have produced an effect widely differing from that which justly dissatisfied you at ——?"

There was no denying the fact; nor indeed had the writer failed to remark it, or to draw the inference, as now drawn by our friendly critic, whether before or after his words had been spoken. Being at Prague, for example, some short time subsequently to the conversation here partially repeated, we were reminded of its tenor by many a pleasant example of the tendency to choosing incidents of the domestic history of their nation, evinced by the gifted painters whose works, were then exhibiting in that quaint and beautiful old city. Here is one, of which the interest is common to every Protestant people of Europe.

The Bohemian painter, Jawurek, takes for his theme that most sorrowful of episodes, the judicial murder of John Huss, at Constance. He does not harrow the soul of the spectator by permitting the victim to be seen amidst the glare of those fires, kindled to prove the worthlessness of the Emperor Sigismund's safe-conduct; the point of time chosen is somewhat later: the crime has been consummated; the name of the dishonoured potentate has become the by-word of the future (for, with every tale of Imperial treachery that has since appalled the world, this deed of darkness is recalled, to *his* infamy), and we stand on that desecrated spot, where the pile of martyrdom is scarcely yet extinguished. There with us, are two grave and majestic forms, profound grief speaking from every feature of their faces, and ineffaceably impressing a sorrowful recollection of both on the heart of the spectator. They are but two, and the scene is but a desolate waste, from whose outraged soil they have gathered a poor handful of ashes, the mournful token which is all they can now bear to expectant Prague of that loved and treasured son, whose safety had been solemnly confided to their protection by the reluctant and anxious city. Yet is what we behold of the highest significance; for these are the bereaved friends of the martyred saint. They are the Counts Von Chlum and Von Dubè—those trusted and honoured men to whom Prague committed the guardianship of her valued teacher when she suffered him to leave the safety of her walls for what was known to be a service of danger, but from the perils of which she fondly believed him to be sheltered by the ægis of Sigismund's imperial honour.

The picture is an admirable one, and presents a perpetual lesson, whether to princes or people; beautiful it is, too, and full of various merits as a work of Art; but of these we are not now to speak; it is with the subject alone that we are now occupied.

Frederick the Elector Palatine, rising from a banquet to receive intelligence of the defeat of his army at the battle of the White Hill, is a work presented in the same exhibition. This is by Cermack, of Prague, and is of value, inasmuch as that it commemorates an event of incalculable importance—one which materially affected the destinies of Austria and of Europe; its effects on those of Protestantism many of our readers will remember. The Winter-King, as the Germans call Frederick of Bohemia, from the circumstance of his reign not extending over a longer period, is but one of many figures crowding this picture, the merits or demerits of which we do not discuss; it is the subject only that we here allude to, and that is not ill-chosen.

The compatriots of the painter reproach him for suffering the messenger of that fatal news to be adorned and perfumed before approaching the sovereign's presence; and they ask the artist wherefore the more appropriate figure of a soldier, covered with dust and worn with toil, had not rather been chosen, that so the "heart of the mystery" might at once have been laid open to the now half-doubting inquirer, who may justly demand, wherefore, then, are these revellers thus startled from their feasting? This question we leave the painter to settle with his querists; but it is not without a certain pertinence.

Other pictures of similar character were treated by the artists whose works adorned the exhibition in question, and to some of them we may hereafter return; but, for the moment, we refrain from specifying these. Let us rather see if our own history may not furnish us with something of approximate, or at least of equally available kind. Our researches will assuredly not be vain. More than one occurrence, well-suited for illustration by the pencil, presents itself to the memory, and shall receive the attention due; but, first, there is a subject of somewhat different sort demanding our care.

Among the many superb halls and galleries devoted to sculpture in the palace of the Vatican, is one called the Nuovo Braccio, erected during the pontificate of Pius VII., and under the immediate superintendence of that pontiff's enlightened minister, the Cardinal Ercole Consalvi. Of priceless worth are the treasures of Art that arrest the steps of him who takes his fortunate way through even this one portion of the vast collection of sculptures assembled in the Vatican, although it is not here that the richest gems in that collection are shrined. But we confine our remarks for the present to one only, which, if not the most exalted in conception, is at least one of the most genial in subject and perfect in execution of all contained in the gallery. This is a recumbent statue of more than colossal dimensions, and of imposing, yet most beneficent aspect; excavated from the site of a temple sacred to Isis and Serapis, when the papal chair was occupied by Leo X., and placed by him in the Vatican. This figure, believed to represent the Nile, is in itself a work of infinite majesty and beauty; but the effect of its massive proportions is enhanced by the presence of exquisite children, all clambering and sporting, with the most life-like truth and animation, over and upon the mighty limbs and enormous trunk of the colossus.

Few lovers of Art give their cordial approval to allegory; its far-fetched conceits too frequently perplex rather than gratify the beholder, and it is but the simplest form of this figure that can

* "Let the toast pass,
Drink to the lass,
I'll warrant she'll find an excuse for the glass."
Song of Charles in "The School for Scandal."

ever hope to enlist his true sympathies. But in this work we *have* the simplest form;—we must needs admit it to be an allegory, since the statue is that of a river-god, and the beanteous boys, toiling in all directions to surmount his colossal form, represent the sixteen cubits which are the desired extent of the Nile's annual increase, yet, so slight are the intimations of allegorical allusion, so pure and simply grand is the conception of the work, that you are at liberty to forget the fact that it *is* allegory, and may resign yourself without interruption to the charming spectacle before you.

The god himself is a figure of rare perfection; the head is crowned with ears of corn, and flowers of the water-lily; a beard of magnificent amplitude flows over the breast, and the face has a most heart-winning expression of benevolence, in the highest sense of that much-abused word.

But the boys! the beautiful children! what a delight are they! you might furnish a total gallery by merely copying those life-like groups,—*merely copying*, did I say—now I would that some half-dozen of our artists would set themselves to do it! we might then hope for a collection such as we are else little likely to obtain.

"The boys," you will say, "the boys! let us see what *they* are doing;" and you are right, they amply justify your impatience to look more closely at the animated pictures they are making for us. The grace and beauty of their infantile forms and eager faces, you will imagine; words could do nothing towards describing these. As to their object in life, *that* is to obtain high place on the marble world presented to them by the vast figure of the god. No idle waiters upon fortune are they. It is true that one of them has been led away by the false hope that he may reach the top of the ladder before he has set a prudent foot on the lower rounds, but you see that disappointment awaits him; disdaining to join his companions, who are toiling to get a first step on the mighty foot, *this* man has laid a covetous grasp on the extreme points of the long flowing beard, and seeks to drag himself up by the massive handful which his tiptoe efforts have enabled him to reach. But, no; it is not thus that the head is to be gained—another moment will see him stranded on his back, and certain of this, you turn to see how the rest are "shaping." Some—legtitimate labourers these—have attained, after due effort, to eminent places on different parts of the limbs, and even of the trunk; one among them is amusing himself with the useless toil of a comrade, who is seeking to mount at the knee. The others are strenuously pursuing their upward path.

At the foot is a wee man who cannot make up his mind to try; the effort is too difficult! he is cogitating the matter, with grave looks that sit comically on the baby face of him, but above,—and already making progress up that long and steep ascent, the right leg,—are good friends of his, who look back with encouraging gestures. Wait awhile; he'll begin presently; their good counsel cannot but prevail.

On the mountain of a shoulder sits one who has made his way to that glorious eminence by many a brave effort oftentimes renewed, be you sure of that. So there he sits and takes breath awhile. Another, whose head appears below the neck, and who is in a truly perilous position, has his too arms clasped round a cable-like lock of the river-god's hair; but how, even with that solid holdfast, he is to establish those struggling limbs on the point he is aiming for on the powerful neck, does not yet appear. Fast approaching the enviable occupant of the shoulder is another successful aspirant; he holds a lotus in his hand, and is extending it towards a comrade less advanced, with an expression that says,—"Keep good heart, man! it *is* to be done."

But the monarch and glory of that gladsome troop, the observed of all observers, is one who has not only reached the broad table-land of the river-god's head, but has actually stepped thence into the Cornucopia which Nilus holds in his large left hand. Yes, he has seated himself there—even *there*—and the pride of his heart may be well nigh seen to quiver through every beautiful part of his exquisite form. One plump foot pressing firmly on the edge of his well-won eyrie, he sits with head erect, his round arms folded on his baby bosom, while the charming face comes forth from the rich curling locks, thrown back in his triumph, with a frank demand for sympathy in his gladness that no heart of man could resist.

In front of the god is a crocodile, whom one of the children raises his hand to strike, but a second interposes, begs for mercy, and a third tries to urge the creature into motion; two others stand gravely considering what manner of animal the playmate of their comrades may be.

Near the right foot of the statue lies one idle beauty, who does not care to emulate the toils of his brethren, he prefers to sport with the flowers that bloom on the river-god's couch. One might say,—"let us hope that he may tak' a thought, an' mend—;" but see! he is doing his best to drag down the good steady man who has won his way to the ankle, which he bestrides with a solemn satisfaction, showing how he hath not accomplished *so* much without his pains. Surely the fruit of all that labour will not be lost? he cannot suffer himself to be dragged back? let us see what comes of the struggle! No; the sensible plodding fellow has resisted,—he will not hear the voice of the charmer, and another wrench shall free his foot from the tempter's grasp.

And now, to say something respecting the life-like truth and animation of all these groups, would seem due to them, and would be but the barest justice; but nothing short of beholding them for yourselves could give you even a faint idea of their varied perfections;—the joyous alacrity of some, the earnest gavity of others, the perfect *life of motion* exhibited by all, and the charm of grace and beauty pervading every part, all this could not be worthily described in words, wherefore I will not waste your time in the vain attempt.

The base of the statue is adorned with sculptures appropriate to the subject; among them are Barks manned by Pigmies,—celebrated by Pliny for their boldness in chase of the various creatures inhabiting the Nile—and figures of the sacred ibis, with a combat between the crocodile and the hippopotamus. The execution of the whole work is admirable, and if one could ever be tempted to feel dissatisfied with the present Rome, it would be when thinking of what the glorious city must have been, when *such* were to be seen abounding in all her public ways.

If there *be* a fault in the sweet mother-land,—and when this question is discussed, we are never able cordially to support the affirmative proposition—but if there *be* a fault, it must assuredly be found in coy reluctance, wherewith alone the blessed sun permits us to behold his comely features, through the larger portion of the year. Grim, grey, and wholly impervious are the veils behind which he, for the most part, conceals the splendours we would so fain be daily worshiping, and for this it is that we *do* sometimes cast looks of regret towards certain of those more favoured regions, whereon his eyes of glory are less unwillingly bent. Nay, are we not sometimes moved to the degree of rushing forth, and of putting between this our well-loved mother, and our shivering selves, that belt of waters wherewith her excellencies and her beauties are girdled in from the "broad profane" of the outer world? We are, there is no denying it; but then, it is ever in chase of a gleam of sunshine, nothing less potently attractive could lure us from her side. No, "by him who sleeps in Phylœ," we go for the sun, and the sun alone, nor, could we find it in our heart to expatriate ourselves, once for all,—would it be for ought save the love of *his* "*beaux yeux*."

Not that even this would avail to produce the effect. We would make visits to other lands—many and often—but for persistent abode, or even for protracted residence, give us the land of our forefathers. England, and no other, is emphatically the place for an Englishman; this is his home, though his tendency to wandering *be* of somewhat frequent occurrence, and granting that his outbreaks do occasionally take him far afield.

For admitting that we bemoan ourselves, and break our hearts over the kindness of Dan Phœbus,—or that we scowl at his obduracy with a visage dark as the sky, through precious

weeks and months, while those lazy Palermitans, Ischiotes, or Calabrese, with many another ragged rogue of our worshipful acquaintance, lie basking in his rays, have we not the sunshine of our own hearths to dry our tears withal? and where, in all the world, shall be found a consolation so complete in all its aspects as is the glow of our English fireside?

"The bonny bright blink o' my ain."

We all know the rest, and fair betide the memory of the poet who so cheerily sung and said it. For the love of this, then, let us still hold fast by the land of our birth,—its grim grey skies and all.

And having agreed to do that, why may we not more frequently warm up our galleries by some of those "exquisite reasons" wherewith we are so amply provided as excuse for our determination? Here, for example, is one out of hundreds at this moment presenting themselves in the fair homesteads of England, that must appeal to the hearts of thousands, and if you will but give us their simple history, as you may see it proceeding before your eyes in the goodly halls of the family that need by no means be specified, seeing that its name is Legion in our land, you will merit well of all whose suffrages are worth the asking, and need not go farther from home for your subject this time.

"*Floreat Etona!*" are the words of greeting uttered with beaming countenance, and in the most cheery of tones, by a true Englishman, standing on his own hearthstone, to the right noble looking heir of his house, whom he has seen to enter their stately portal, but who has been arrested on his way to the magnificent room within which he remains—and we with him—by the two sweet sisters hastening down a splendid staircase, also visible from our "post of vantage."

The bright face of the young Etonian, upturned to meet their glance, gives us fair opportunity for marking the frankness and truth of his brow: the clear intelligence of his eyes, the force implied in that well-formed chin, with the mingled firmness and sweetness of the mouth, are alike revealed by this attitude, while there is a beautiful expression of heart-warm affection now lightening over all these features, as he replies to the looks of love showering down upon him from those fair heads bending over the massive balustrade; their silky locks half conceal the faces, which are, besides, turned to him, and not for us.

His lithe elastic figure has meanwhile not ceased its forward movement, even now will he clasp those glad sisters in his embrace, and that before they have well gained the lowermost stair.

"Hal has come! he has *come!*" cries exultingly a much younger boy, who has rushed before him into their father's arms, with the news. Long emancipated from the inglorious dominion of "my sisters' governess," this fine member of our family gathering is the faithful satellite of his brother. He has inherited Hal's pony, since the latter assumed that most envied of thrones the "Pigskin" (but not as yet the "Pink") on the clever mare always found in so good a place with the Cottesmore hounds last season; and in his secret soul has that urchin vowed to emulate the honors of his senior, through all the wider fields of youthful ambition.

For Hal is the god of his idolatry, and that no finer fellow than he adorns this whole world's round, is the younger brother's most cherished creed. He, too, will join that band of our "*jeunesse doree*" who disport themselves on the banks of Thames, where the conscious river reflects England's one truly royal hold, the Castle of Windsor. He waits impatiently for the time, and thinks how he, too, among other bold deeds, will then sit *down* in his saddle, and keep "his horse's head straight,"* as enjoined by a competent authority of the day, whose example effectually illustrates his precept.

The still fair mother of these rejoicing children is crossing the floor with steps that have not lost their lightness, and whose eagerness cannot mar their grace; a more ancient ancestress is rising from her cushions, to throw off half the oppression of her years, as she takes her part in the greetings to ensue. Other accessories there are, but I cannot pause to describe them. Dogs of various races assert their claim to a share in the gladness. And now, if you are not glad for them yourself, the dear people—Etonian, boy-brother, dogs and all—nay, if you cannot see that even the pale governess, stealing down after the two fair girls, and forgetting to restrain the bounding fairy at her side—whose hand she holds but to steady her steps—if you cannot see that even *she* has a beam of welcome for Hal on her face, it is not you who shall paint their picture. Call your comrade, with a heart in his bosom, for this labor of love; you would spoil my heartsome faces for me, and I want them to be set before us with all the warmth of their feelings, no less than with the intelligence of their brows and the beauty of their race.

And a something like *this*—the same in its heart-warming happiness, and differing only in the less or greater luxury of the details and accompaniments—may be witnessed, as every such season comes round, in the dwellings of high and lowly, throughout the length and breadth of our country. Why, then, should we bewail the son's long absence? Say that he does still keep aloof—and Heaven knows that it is but too true—let us wipe the tears from our eyes, nevertheless. We make sunshine of our own, we English; and when you have painted me these my people, with all the genial glow of your own fervid nature, O painter of my heart, transfused into good-looking forms and faces, we may defy the world to say that they at least have not well understood the process.

And now, remembering that flogging we got no long time since from our friendly German critic, what say you to looking at our old chronicles; or, if you better like them, at the annalists of a latter period? But first, let us glance at a morning's work notified by the good Canon, Walter Hemingford, a writer born in the reign succeeding that of the monarch whose doings we are about to commemorate.

If not very edifying, the scene Hemingford describes† has at least the elements of pictorial effect in abundance, and may beside avail to make the fair lady-artist thankful that her lot hath been cast in these later times.

You have, firstly, the third of our Plantagenet kings—even John, of evil memory—employed in what he was pleased to call the destribution of justice, and attended as befits his state. But the business of the morning is peculiar: this is not a criminal court; the prince is merely adjudicating on certain matters between himself and his "wards of the crown;" and it is after this fashion that he settles them:

The lady of rueful countenance whom you see standing immediately before John's seat of justice, is Alice Bertram. She has just been comdemned to pay 100 marks—a serious sum in those days—"for not coming to be married to one of the king's vassals at the said king's summons." Unreasonable Alice!

That the dame approaching from the right—a goodly matron, with her children clustered round her—is a certain "Celestia, widow of Richard, the son of Hubert." She hath come to offer those same "marks," and in good number, to the end that "she may not be *distrained* to marry, except her own good liking."

Advancing up the hall, Isabel de Bolebec, an orphan damsel, who hopes for the same immunity; but she knows the humor of her sovereign and promises "three palfreys," in addition to 300 marks, with this proviso: that he "be good lord to her," and release her from the dread of enforced marriage; she meanwhile making engagement to accept no husband without the king's consent. There is an anxious face of a youth peering from behind a group of older men, and gazing at this very Isabel, which looks as if its owner were not without an interest in the result. Heads of horses appear through the distant doorway; are they those of Isabel's proffer?

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* See Mr. Warburton's "Lyrics of the Chase." His words are those that follow, or nearly so, for verses and title are equally quoted from memory.

——— "If your horse is in blooming condition,
Well up to the country, and up to your weight,
Oh then give the reins to your youthful ambition,
Sit *down* in your saddle, and keep his head straight."

† See also Madox, "History of the Exchequer."

Nay, 'twere rash to say so, for yonder stands Bartholomew de Muleton, who has bought the guardianship of such lands as Lambert Yvetoft left, with that of his heir, to say nothing of Lambert's widow, whom he hath leave to marry himself, or give her to any other, as shall best suit him. For this, be sure, Bartholomew must pay well; and the horses may be tribute from *his* stores. Whereof enough: but methinks we have some pithy picturing here, and that not always of the merriest for the Alices and the Isabel's concerned; the Bartholomews fared better, as of right: but even for them things did not always remain couched on the rose-leaves so often cited, as we may have future occasion to show,

The life of Henrietta Maria, daughter of Henry IV. of France, and queen of Charles I., was at one period chequered by many a "moving accident," as our readers will all remember. Here is an instance that would furnish a variety of subjects for the painter, and has claim to that distinction which the living canvas bestows, not only as a well authenticated fact of history, but also as a theme calculated for the exhibition of more than one quality in the artist who shall treat it.

The circumstances are related by Henrietta herself, in a despatch written to her husband, by whom she had been sent to Holland in search of aid against the Parliment. The queen landed in Burlington Bay, after a perilous voyage and narrow escape from Admiral Batten, the Parliamentary leader, who had nearly made her prisoner, despite her Dutch convoy. It is at this moment that the incidents related in the following letter take place.

Burlington, 25 *Feb.*, 1643.

My Dear Heart,—As soon as I landed, I despatched Progers to you; but hearing to-day that he has been taken by the enemy, I send this bearer to give you an account of my arrival, which has been very successful, thank God; for, as rough as the sea was when I first crossed it, it was now a calm, till I came within a few leagues of Newcastle, when the wind changed to north-west, and compelled us to make for Burlington Bay; where, after two days lying in the road, our cavalry arrived. I immediately landed, and later in the morning the rest of the troups came in. God who protected me at sea, has also done it on land; for this night, four of the Parliament ships came in without our knowledge......These four ships soon began so furious a canonading, that they made us get out of our beds, at least us women, for the soldiers behaved very resolutely in protecting the boats of ammunition.

"I must now play the Captain Bessus, and speak a little of myself. One of these ships did me favor to flank my house, which fronted the pier; before I could get out of bed, the balls wistled over me, and you may imagine I did not like the music. Every body forced me out, the balls beating down our houses. I went on foot some distance from the village, and got shelter in a ditch, like those we have seen about Newmarket; but before I could reach it, the balls sung merrily over our heads, and a sergent was killed twenty paces from me. Under this shelter we remained two hours, the balls flying over us, and sometimes covering us, with earth. At last the Dutch admiral sent to tell the Parliament ships that he would treat them as enemies if they did not give over. This was rather of the latest, but he excused himself on account of the fog. Upon this the Parliament ships went off; and besides, the tide ebbed, and they would soon have been in shoal water.

"As soon as they had withdrawn, I returned to my house, not being willing that they should boast of having driven me away .....All this day we have been landing our ammunition. It is said that one of the Parliament captains came before the cannonading to reconnoitre my lodging; and I assure you he had marked it exactly, for he always fired at it. I can say with truth that by land and sea I have been in some danger, but God has preserved me, and I confide in his goodness, that he will not desert me in other things. I protest to you that in this confidence I would face cannon, but I know we must not tempt God. I must now go and eat a mosel, for I have taken nothing to-day but three eggs, and slept very little in the night."*

* Harleian MSS., 7379.

A truly characteristic letter, and one not ill calculated to awaken that interest for his subject without which the labors of the artist are but of poor avail. Several points in this narrative are highly succeptible of pictorial illustration, weather sea or land be the object of the painter's predilection. They do not need minute specification; the simple, yet highly effective relation of the queen is sufficiently graphic, and he who does not perceive her page to be sparkling with not one only, but many pictures, may throw his pencil to the dogs. Nor is the *scene* of this adventure unworthy to be limned. The beauty of Burlington Bay is acknowledge on all hands; the bold promotory called Flamborough Head, around whose rocky base the wild waves fret themselves into clouds of snowy foam, terminates fittingly its graceful curve; sea-birds, in countless numbers, heighten the animation of the scene, as they wheel about on flashing wing, their softly-tinted plumage glistening through the diamond spray; the hoarse cries they send forth are no inappropriate accompaniment to the hollow reverberation of the deeply-caverned cliffs, which are here of imposing altitude, and are crowned by a snow-white and glittering Pharos, remarkable for the pure elegance of its proportions.

The supremacy over her sister Arts, accorded to Sculpture, by Seneca, Lactantius, and other writers of antiquity, was stoutly upheld by the old Florentine, Benedetto Varchi, in the sixteenth century, and has furnished abundant matter for dispute among artists, down to a much more recent period.

For we may not affirm that the votaries of painting held their peace when these questions were in agitation. All will remember the fluency—if we are not to say the force—wherewith Vasari maintains the excellence of his own beloved Art; and few will forget the picture ingeniously painted by Giorgione, to prove that painting could represent the object on every side at one view, no less effectually than sculpture.† Later still, the lively Frenchman, Dumont, retorts on the sculptor Falconet, who was boasting the universal capabilities of his Art, in the following words: "Fais-nous donc un clair-de-lune avec ta sculpture;" ‡ but on this the accurate Stirling remarks that Vasari had previously cited "*il lucer della luner*," as one of those subjects which are beyond the power of the sculptor to intimate.

Don Felipe de Castro. *primer esculter de Camara de Su Magestad*," the king of Spain, in the middle of the last century, upheld the part of sculpture in that country against Pacheco and the painters, and—as we find in the admirable author cited above—he translated the work of Vasari into his native Castilian, for the benefit of such as could not read it in the original. How much or how little this would contribute to convert Pacheco and his followers, the reader will judge. In a note to this passage, Stirling has the following: "The final problem with which he (Vasari) poses the sculptor is, to represent a clown blowing his porridge, and to represent the breath of the one and the steam of the other."§ At a word, there has been no lack of disputants on either side; but we are not now disturbed by the profitless discussions. Each resplendent sister has long since taken her glorious place in the world's estimation, well content, and justly so, with that appointed her. No painter now racks his brain for means of presenting all the sides of his picture at one view, and on the same canvas; nor does any sculptor feel aggrieved by the declaration that he cannot show the steam as it rises to the nose of the man who eats his pottage,

There is no longer any reluctance on the part of the sculptor to admit that his fields of range are less extensive, or, at the least, less varied in their character, than are those of the painter; and this acknowledged, the former is all the more unwilling to leave unappropriated any part of that domain which is more particularly his own. How then does it happen that we so rarely find him occupied with a subject that, more than all others, might be supposed likely to appeal to his sympathies? We mean that most spiritual of the Camœnæ, the Nymph Egeria. Even in the mother-city of Art, great and beloved; even in

† See Vasari, "Life of Giorgione."
‡ See "Annals of the Artists of Spain," vol. iii., p. 1237, *et seq.*
§ Stirling, *ut supra*, vol. iii., p. 1238.

Rome, the guiding genius of Numa hath not yet had "all her praise," nor by the sacred haunts of that Fountain, well-nigh within your ken as you leave the city, though duly honored by Livy and Plutarch, do you see the temples you so naturally hope to find in a region so highly honored. Again, by that other Fount of Aricia, beloved of Art for its own fair beauty, no less than the memory it holds of fervid praise, as breathed from the lips of Silius Italicus, nay as uttered by Virgil himself, the fanes you look for are not yet consecrated to this most legitimate object for the worship of Art.

That no early statue of Egeria has been found, is without doubt, one cause of the want we deplore; for too frequently has the artist of all ages condescended to reproduced the idea already familiar, when he should rather have enriched his Art with some offering, the result of his own genius. But this circumstance is amply accounted for by that law, promulgated by Numa Pompilius, whereby all representation of the gods by human forms was forbidden: and so rigid was this prohibition, that nearly 200 years had elapsed from the death of the legislator, before any statue of the gods had been placed in a Roman temple. Those found in Rome at a later period were the work of Etruscan artists. Thus the sculptor has had a few models for his *imitation*, as regards this fertile subject. For the fact that he has not more frequently trusted to his *inspiration*, we have already expressed our regret, and will not recur to it. The absence of ancient works on this theme is then not surprising, however much to be lamented, but that so few statues of Egeria have been attempted in modern times is less easily accounted for. That the mutilated figure, lying in the fountain, in that part of the Roman Campagna which Italians now call the Caffarella, but which is perhaps better known to English travellers as the fountain of Egeria, is no statue of the nymph, none who have seen it will require to be assured—it is, in fact, not the figure of a female at all.

The few statues representing Egeria with regal attributes, and making her the personification of peaceful rule, as opposed to lawless anarchy—that, for example, by Rene Fremin, a pupil of Giradon's—do but poorly express the many attributes attaching themselves inseparably, and as her undoubted apanage, to that image we all hold in our hearts, of the exquisite Camœna.* Wisdom in its perfection, and therefore Goodness in its highest manifestations, as well as in its most attractive form; these are at once presented to our thoughts, and demand our willing reverence, as we think of Egeria. For what are we to understand by the influence of the Nymph, if it be not that *this* constituted the whole sum of those virtues whereby Numa was enabled to elevate his people, and thus to render them happy?

By no effort of human genius could all the lofty ideas connected with the image of Egeria be worthily represented in the external sense,—but among her attributes is one by which she is brought well within the limits of human sympathies. This is that sublimated affection, far raised above all taint of earth, which forms a distinctive peculiarity of the Camœna's character, and is perhaps inferior to none in its beneficial action on the destinies of mankind. He, then, who shall exhibit Egeria in this one phase of her etherial being, will assuredly place the beholder in such a presence, as must be worthy of admission to and deep worship in, the purest of Art's shrines.

Now would that Thou hadst lived to make this worthiest of themes thine own—ah, too early lost!—but no, let us not bewail the departed; let us rather wait in hope for the advent of that Master whose soul the deep-veiled Future is preparing for this work.

Look to it, then, ye who aspire to the high name of Sculptor, believe not lightly in the whisperings of self-love,—yet let him whose brow is indeed destined for the laurel, not forget that "Be bold! be bold!" was an injunction that preceded the "Be not too bold!" Few among you need reminding of the latter precept, none know better than yourselves that true modesty ever accompanies true merit—that the counterfeit of either is soon detected. But for success in this emprize, there is more than mere boldness, and more than ordinary merit required—let him who shall undertake it, see that his inspiration be derived from no source unworthy of his theme, let him approach his exalted task, then only when the robe of Art's most solemn priesthood may be assumed without peril of desecration; thus alone can we hope to see breathing from his marble, some faint perception of the true Egeria—perfect Wisdom, that is, and *therefore* GOODNESS in its highest manifestation.

On the brow of the nymph there is the inspiration of the Sibyl—as of right—but, even yet more effectually appealing to our sympathies, there is also Love—the deep love of the Seraph†—which beams from every feature of her faultless face—for the divinity of Egeria was in that Love. The sweetness of the perfect mouth has no touch of earth, and to the delicate cheek, the artist—himself inspired—whose soul shall be transfused by this dream of beauty, will feel constrained to impart a refinement, unknown to the mere ideal of physical perfection in form as applied to the grosser Olympian deities; while the softness of the chin shall have a firmness withal, truly declaring the power of the Camœnæ for *enduring*. Yes, Egeria might have borne aught save the departure of the beloved—beneath that infliction her divine spirit sank, and was dissolved.

Many and beautiful are the phases of her exquisite existence, that must at once arise to the mind and memory of the artist—but say that he attempts to render his idea of Egeria listening to the step of the approaching monarch—his footfall has sounded on her ear, and the blessedness of an ineffable content is in her heart; no eagerness disturbs the calm of her more than regal beauty, the finely moulded head is slightly raised and thrown back, while the richly rounded yet flexible figure exhibits that grace which is inseparable from our idea of the Nymph Egeria, and is indeed the unfailing result of a beauty whose fount is in purity of heart, and elevation of soul.

This, then, is Egeria's moment of happiness; but how sad the contrast that awaits her!

For let us suppose that the artist—sculptor or painter—who shall have given his heart's best love to this pearl of an old mythology—and let none other presume to approach it—let us suppose that he has proceeded to shadow forth the idol of his reveries as advanced into the next mournful period of her life on earth. The gods have reclaimed their own, Pompilius has departed, and the haunts of the Camœna are left desolate. She has sought forgetfulness in the forests of Aricia—once, says Silius Italicus, her favored abode—but the wood-nymphs seek in vain to assuage her grief; they have gathered mournfully around her, their graceful groups scarcely less worthy of the sculptor's art than is the form of the sorrowing Egeria herself.

Hippolytus has joined his efforts to those of the Dryads; the hero, devoutly worshipped in Arician forests, has forsaken his shrines to offer consolation to the bereaved. But, like the wood-nymphs, he has failed—her suffering has no truce, and "the worship of the great Goddess Diana is interrupted by her plaints, which do not cease."

Hippolytus departs, as do the wood nymphs, and Egeria is left to her sorrows; left by all save the Art-devoted, who is wholly her own. He returns, as to the lode-star of his life. The Camœna has not found consolation, but even as he gazes, there comes a change. From the most retired depths of her sacred groves the compassionate Atemis approaches—he beholds her advancing, he kneels awe-stuck; Egeria, too, has perceived, the goddess Camœna feels that her deliverance draws near, her drooping head is once more raised; a brightness, as of more than mortal beatitude, succeeds to the superhuman sorrow by which that beauteous head was bowed: the pitying Dianna will complete her work, and Egeria shall cease to grieve, as her form dissolves into that Fountain whose purity shall ever remind the beholder of her own.

And now, seeing this, shall not the Artist—painter or sculptor—once again betake him to the pencil or the chisel, insufficient though he find them to the perfect realisation of those high

* It may, perhaps, not be unnecessary to remind the reader that the Camœnæ are of a higher order than the Nymphs generally, since they add to the attributes of the latter the Sibylline distinction of prophecy, and are endowed with knowledge of *all* the future.

† The reader will remember that, in the hiearchy of angels, the seraph is the spirit of *love*, as the cherubim are the spirits of *knowledge*.

thoughts suggested to him by his immortal Art! Let him not fail therein! and if he bring not forth in all its radiance that divine creation which hath made glorious *his* dreams, he shall at least produce a presence, fair beyond aught that our more earthly perceptions had power to imagine of pure and beautiful.

[The author is not aware that his subject is now being treat-by one of the most accomplished sculptors of the age—Mr. J. H. Foley, A. R. A. He selected it for "the commission" he received from the Corporation of London.—Ed. *A.-J.*]

DESTRUCTION OF DAGUERREOTYPES BY ACARI.

To the Editor of the Photographic Journal:

Sir,—Now that the subject of the preservation of photographic pictures is under consideration, it may not be out of place to mention a circumstance which has just come under my notice viz. the destruction of a daguerreotype picture by acari.

On visiting a lady and gentleman the other evening, photography being the subject of conversation, I was shown a picture by "Beard," made some seven, eight or ten years ago. Observing that, like most that I had seen of the kind, the portrait had very much faded, and also that there was much damp and dust upon the glass, as also upon the plate, I advised greater care to be taken of it, and that it should be taken out of the case, cleaned, and the edges secured, to prevent any re-accumulation. I also undertook this latter task, which has become both interesting and instructive, because it has clearly shown that the mode adopted for the preservation of such pictures is insufficient, and that other than atmospheric influences may be, and are, effectively engaged in the destruction of these mysterious but beautiful productions.

Before disturbing the picture, I made a superficial examination of the more faded parts with my pocket microscope from curiosity, and found the plate to have become spotted, and in the centre of each spot was to be seen a nucleus such as we find on the collodion plate when any sediment may have been poured from the bottle. Upon further examination, with deeper powers and under the compound microscope, it was found that the exuviæ of acari, their decomposed bodies, and probably excrementitious matter, constituted all the nuclens spoken of, and which in fact had destroyed the picture. I was careful to preserve one of the subjects, which I intend to prepare in balsam. The picture, mat, and glass were bound together by the beuding up of its edges on a kind of tray.

I may further add, that the present case also shows that the deposition of gold is not a permanent preservative of the daguerreotype picture, since the gentle touch of a camel's-hair pencil removed the superficial deposit which constitutes the picture, leaving the auriferous film still attached to the silver surface, which is another point worthy of consideration.

I am, Sir,
Most respectfully yours,
J. Fedarb.

THE DUSSELDORF SCHOOL OF PAINTING.

There is no country in the world in which there is more intelligence, more learning, or more thought than Germany; the Germans are a patient, laborious, and industrious people, are profound in their learning, acute in their criticism, and ever seeking new fields for their intellectual energy. With all these advantages, these moral helps to the building up of a great uation, they have been deprived by their rulers, and by the peculiarities of their forms of government, of all freedom of thought and action in political matters; they have been shut out from the advantages of self-goverment, and relieved from the responsibitities of independent action.

The consequence, however deplorable it may be in a political point of view, on which we will not now stop to enlarge, is that the German have turned their thoughts and devoted their time more to Art than any other modern nation; there is hardly a town, however small or insignificant, in which there is not an Art-Union, an annual exhibition of pictures, an institution devoted to instrumental music, a male and female singing club, and a theatre; and into whatsoever society you may go, from that of the tradesmen smoking their eternal pipes in village inns, to the polished courtiers in royal palaces, you will find an appreciation and understanding of books and pictures which you may seek for in vain in our own more practical and matter-of-fact country. This love of the Fine Arts, which seems to have renewed its youth in the days of Gothe, Herder and Schiller, is at present the safety-valve of society in Germany, where party feeling runs so high, and where the vexed questions of religion and politics are now beginning to agitate the country. My present object is however not to speak of Art in its numerous branches, but to confine myself to a few observations on the two great schools, those of Düsseldorf and Munich, and of the painters of the present day, the men who for the last five-and-twenty years have guided the taste of Germany, and who by their instruction and example have brought their shools to that high state of perfection in which we now find them.

The Düsseldorf school may be said to date its revival, if not indeed to have derived its existence, from the advent of William Schadow. In the year 1856 he left Berlin, accompanied by a small band of favorite pupils. and having been appointed to the office of director of the Academy of painting, in the early part of 1827, he took up his residence in Düsseldorf. He found that his predecessors had done little for the advancement of Art. Cornelius had gone to Rome, having effected nothing; and those who had followed him, men respected and respectable in their private life, possessed neither productive talent or critical knowledge, and were especially deficient in the rare and difficult art of imparting instruction. Schadow saw at once that he must begin with a totally new method; that the foundations of the building were crumbling away, and that if he meant to erect a durable or permanent edifice, he must sweep away the tottering brickwork and build up afresh from the very ground. He felt that the young artist is too often at the begining of his career recklessly thrown into a sea of difficulties; that he is expected to apply himself to too many and varied studies at the same time—acquiring perhaps much, but digesting little. To obviate this evil, Herr von Schadow began his new system of instruction, by dividing the classes into three distinct sections,—which we may call the elementary, preparatory, and the finishing. The first, as its name denotes, was devoted to the earliest rudiments of Art, and every detail was attended to with the strictest conscienousness, the teacher wisely judging that whatever was worth learning at all was worth learning well, and that the pupil would be spared great future trouble and disappointment if, at this period of his career, he fully mastered the mechanical and apparently trivial details. In the preparatory class the student was required to draw from antique statues and living models, to make studies of drapery, copy pictures, and devote his time to architecture, anatomy, and perspective. Having passed a sufficient time in this class, the young painter was promoted to the third or last course; here he was encouraged to be independent, to think for himself, invent his own compositions, work out his own ideas, cover his canvas with the result of his own studies, in short, to be as unfettered and unshackled as posible. The director was thus enabled to see what was in the pupil; to correct, advise and encourage; to turn his genius into the channel most suited to it, or divert him from the new-fangled and ephemeral, but often attractive, theories which prove the destruction of young artists.

To this system of instruction, persued firmly and undeviatingly for the last quarter of a century, we owe the preasent school of painting in Düsseldorf. It was not however erected in a day; it had many difficulties to overcome, shortcomings to deplore, internal and external jelousies to encounter; but withal it had many and rare advantages. In the early years of Schadow's directorship, the society of Düsseldorf was one of the most intellectual in Germany. Immermann had taken up his quarters here; he was followed by Fredrick von Uechtritz, Karl Schnaase, and many others whose names are famous in modern Ger-

man literature. Robert Reinick, the painter and poet, whose graceful verses and pleasent tales will warm the hearts of old and young for many a long day: studied here, and Mendelssohn came, and after him Reitz, and Hiller, and Robert Schumann. Converse with such men had the most beneficial effect on the young artists. They did uot remain mere painters, they lived in a refined society, they cultivated their intellects, not there individual talent alone, persued studies suited to their capasities, were content for a time to forego " the paltry jargon of the marble mart," to throw themselves as equals into the republic of artists of all kinds, giving and receiving information.

At this time the painters all worked together under one roof, and this contribnted in no small degree to the family union which existed among them. They all met every day in the great building of the academy; the most friendly feelings existed, the stndents wandered from the *atelier* of one friend to that of another, critizicised each other's works, delighted in each other's success, and as they smoked their pipes together, helped each other with advice and counsel. The masters had their painting rooms in the same old rambling and labyrinthine structure, and freely opened them to the students; here Schadow, full of love and feeling for pure Christian Art, directed and advised; Carl Sohn, and Theodor Hildebrandt taught; Wilhelm Schirmer showed his profouud knowledge of nature and deep study of landscape painting Mûcke instructed in anatomy, Wiegmann in architecture, and Keller in drawing and engraviug. It was, socially speaking, the golden age of the Dûsseldorf school. At this time the romantic element reigned supreme: illustrations of German ballads and Rhine legends, Little Red Riding-hoods, and Aschemputtels, Gretchens, and Leonoras covered the canvas; it was a time of faith and trust, of confideuce in themselves—the confidence of youth and hope, and over-flowing feeling. The school wanted however, not a little of the castigation of the critic. Those who were accustomed to pronounce judgment ou the labours of the academy were men whose knowledge was too limited, or whose censure was too mild; men who admired too indiscriminately and too euthusiastically, who loved, not wisely, but too well. This period was by no means a short one, it lasted fully ten years. The school of Dûsseldorf then made a stride in advance. Edward Rendemann (though in my opinion he never has surpassed, in depth of feeling aud fuluess of poetry, the early picture which established his fame) showed more knowledge of his art, more boldness iu the treatment of his subject, more confideuce in his own strength. Lessing began to astonish the world by the variety as well as the greatness of his talent. Alfred Rethel displayed more vigor and a healthier tone in the treatment of his favorite fatherland legends, and Sohn faciuated with the beauty of his portraits and the delicate handling of his female figures. But this improvement was not unaccompanied by eounterbalancing evils—political and, more fatal still, religous differences found their way into the sheepfold; the happy family party was broken up, the simple artist life was over, and in its stead noisy political discussions occupied the oveniugs, religous arguments nrsurped the place of rational conversation, and fanatical zeal supplanted Christian love. Soon the once united Düsseldorf school became a house divided against itself. The artists no louger worked together, they hired studios in different parts of the town and seperated themselves into cliques and parties; the old castle the building in which they had so long met, was now deserted, save by a few painters and the appointed professors; tho critics too began to be more severe, aud the artists, iucited by rivalry, pnt forth their strength and developed their powers still further. The child-like simplicity and harmony of the early school has passed away, and been swallowed up in the abyss of time, but the world has been a gainer. Düsseldorf at preasent possesses painters who may fairly take their stand, in all the branches of their art, with any in the world, whether in historical subjects, in landscapes, in portrait paiuting, or in *tableaux de genre.* She has attracted to herself scholars from all parts of the world; India and America have contributed their quota, Saxons, Scandinavians, Romans, and Sclavouians crowd her *ateliers;* aud she has sent forth disciples and missionaries to found new shools. Bendemann, Hübner, and Erhardt, have carried her principles to Dresden; Becker and Schroedter to Frankfort, and others who have made their names more or less known to fame, but equally imbued with the ideas and feelings of Wilhelm Schadow, are scattered over the free cities, the capital towns, and the petty principalities of Germany.

On the 30th of November, 1851, Herr von Schadow celebrated his twenty-five years jubilee as Director of the Düsseldorf Academy. All the principle inhabitants of the town, including artists, citizens, and government officials joiued together iu the work of love. We have no idea in our hard, every-day, practical life, in what was once called " Merrie old England," of the deep feeling, the true affection, the tenderness and love, with which the Germans contrive to surround these festivals—whether it be the common Christmas tree, the family birthdays, the marriage anuiversaries, or the rarer and consequently more elaborately celebrated silver and golden weddiugs, or quarter or half century jubilees of office tenure. On the eve of the festival which we are now describing, a long procession of blazing torches appeared under the windows of Herr von Schadow's honse, with the accompaniment of a Liedertafel (a men's singing club), bringing a serenade to his honor. On the following morning we found that the old " Steinweg," the street in which the artist's house was situated, had chauged its name, and by command of the Mayor and corporation was henceforth to be called " Schadow Street," Countless depntions approached his doors from distant towus, and various public bodies,— men, many of whom differed from him widely iu politics and religion, but who came ouly to honor the artist. The windows and balconies were decored with flags and many-colored carpets, reminding us of those solemn processions in the Eternal City, where the faithful oruament their walls with carpets, old tapestries, any bit of rich color or brilliaut drapery that they can lay their hands on. A splendid festival closed the evening with " tableanx vivants," dramatic representations, a grand banquet, and the most beautiful music. Thus it is in Germauy that men delight to honor talent to express some acknowledgment for the long and weary years of patient labour during which the artist has struggled often alone and unaided. In Euglaud we should be ashamed of such an exhibition, we shoud be afraid of compromising ourselves. We provide banquets for conqnering heroes, Indian viceroys, successful speculators, for railway magnates, but we leave the artist to starve in his garret or become at best a succesful tradesman, a fortunate dealer in his own wares. Herr von Schadow is now, after twenty-eight years sojourn in Düsseldorf, about to leave and return to his native city. He has, I understand, resigned his directorship of the of school which he may be said to have founded, and, though no longer young, to have accepted the office of diractor at Berlin. His successor has not yet been appoint at Düsseldorf.

J. W.

From the Jour. of the Phot. Soc.

STRENGTHENING NEGATIVES.

To the Editor of the Photographic Journal:

Sir,—If the negative should not be found sufficiently forcible after the treatment described by Mr. Buckler in the July Number, 1855, p. 206, it can be very considerably augmeuted by the following solution applied to the plate *before dried:*

3 grains chloride of gold,
3 grains hydrochloate of ammonia.
1 oz. distilled water.

The superfluous quantity may be returned to the bottle. A faint positive may by this method be brought to a dense negative. Trusting this hiut may be of service to some of your readers,

I am, Sir,
Yours most obedieutly,
John Titterton.

From the Jour. of the Phot. Soc.

MR. HARDWICH ON THE ACTION OF SULPHUR UPON POSITIVE PROOFS.

The behaviour of photographic prints when treated with various sulphuretting compounds, is a subject which has of late much engaged the attention of photographers. Mr. T. A. Malone, who experimented in this branch from an early date, appears to have been the first to notice that the most intense photograph might be destroyed by acting upon it with a solution of sulphuretted hydrogen or a soluble sulphuret, for a sufficient length of time.

More recently the subject has been further examined. I myself investigated the properties of the hyposulphite fixing-and toning-bath, and in a paper published in the Society's Journal for Sept. 1854 succeeded in proving the presence of an unstable sulphur compound which changed the proofs successively to black and yellow.

MM. Davanne and Girard, in their report on the fading of positives in the *Bulletin de la Societe Francaise*, Oct. 1855, add to our stock of knowledge by insisting on the fact, before suspected, that prints toned by sulphur are liable to change, and may pass from black to yellow by the mere action of moisture, independently of fresh sulphuration.

These appear to be the main points which have been satisfactorily determined up to the present date. In this paper it is my intention to connect them together into a clear and succinct statement, adding such facts as I have been enabled to establish by recent experiment.

The changes produced by a sulphuretting compound acting upon the red image of a simply fixed print are these: the color is first darkened, and a degree of brilliancy imparted to it; this is the effect termed "toning." Then the warm tint by degrees changes to a colder shade, the *intensity* of the whole image is lessened, and the half-tones turn yellow. Lastly, the full shadows pass also from black to yellow, and the print is faded.

Now in this peculiar series of changes we notice the following points of interest. If at that particular stage at which the print has reached its maximum of blackness, it be raised partially out of the liquid and allowed to project into the air, the part so treated becomes yellow before that which remains immersed. Again, if a print toned by sulphur be placed in a pan of water to wash, after the lapse of a certain time it begins to change slowly from black to yellow, the action often commencing at an edge of the paper which is near to the surface of the liquid, and proceeding in a very regular manner directly across the print.*

These facts naturally suggest the idea that the *oxygen of the air* is concerned in producing that yellow change which gives the faded appearance, and further experiments confirm this view. Strips of darkened paper, toned by sulphur, and washed with extreme care were placed in an atmosphere of pure and moist oxygen gas; they became at last yellow, although more slowly than similar strips exposed to damp air.

The results of the following experiment are even more conclusive. Strips of sensitive paper, which had been darkened by light, fixed and washed, were enclosed in each of two jars containing *pure* sulphuretted hydrogen gas collected over mercury. A few drops of water were then thrown up into the jars, in order to saturate the gas with aqueous vapour. Next *a bubble of air* was introduced, by means of a bent tube, into one of the jars only. On examining the progress of the experiment after the lapse of some hours, it was found that the darkened paper in the pure gas remained unaffected, whilst that in the mixture of gas and air had become yellow. A repetition of this experiment gave the same result, and proved satisfactorily that the darkened sensitive paper might be preserved in damp sulphuretted hydrogen gas for at least six weeks (possibly for an indefinite time), without fading, if air were properly excluded†.

The rapid deterioration which sulphuretted prints undergo when wetted, is therefore probably due to the action of air dissolved in water, rather than to an influence of the moisture itself, independent of oxygen. To assist this inquiry, I have placed sulphuretted papers in distilled water containing various substances in solution. The change of tint from black to yellow is facilitated by the following agents:—1st, *powerful oxidizers*, such as chlorine, permanganate of potash, and chromic acid; these, even when highly diluted, act with great rapidity. 2nd, *bodies which dissolve oxide of silver*, as alkaline cyanides (in dilute solution); hyposulphites; acids‡; ammonia, &c. Potash, although a stronger alkali than ammonia, has not the same effect.

Theory of the yellow fading further examined.—Many of the views which have been advanced appear to me to be erroneous. By some the change has been ascribed to the gradual oxidation of the black sulphuret of silver into pale *sulphate* of silver; but, setting aside the fact that sulphate of silver is soluble in water, whereas the faded images are insoluble, there seems to be no proof whatever that sulphuret of silver has that extreme tendency to absorb oxygen which has been ascribed to it. By taking an ordinary talbotype negative, and placing it first in chlorine-water until converted into white chloride of silver, and then, after washing, in aqueous sulphuretted hydrogen, we obtain a brown image, less intense indeed than the original, but very perfect in the details and shading. This image consists of *sulphuret of silver*, but experiment will show that it is not by any means readily destroyed by those agents which injuriously affect common photographs. Neither sulpuretted hydrogen nor a dilute solution of permanganate of potash produces any effect upon it. Chlorine acts but slowly. So far, then from the instability of sulphuret of silver being a cause of fading, if photographs could be prepared in which the image consisted of pure sulphuret of silver, an advantage in point of permanency would be gained.

Another hypothesis has been recently advanced by MM. Davanne and Girard: they suppose two forms of sulphuret of silver, isomeric and convertible. The one is black, the other yellow. To test the probability of this view, I have washed paper alternately with solutions of nitrate of silver and sulphuretted hydrogen, until it reached a full brown tint; afterwards digesting it with those liquids which previous experiment had shown to be most active in promoting the fading of sulphuretted prints. No result, however, has been obtained, the color remaining the same under all conditions. The true state of the case as regards the color of sulphuret of silver may be stated thus: when existing in a very fine state of division, its proper tint is *yellow*, and not black. Those who observe the manner in which polished silver becomes tarnished on exposure to the atmosphere, will notice that it assumes at first a golden-yellow tint, which gradually deepens to a full brown or black as the layer of sulphuret of silver increases in thickness.

Before giving my own explanation of the fading action of sulphur upon positive prints, I may remark that I consider the darkened substance which forms the image in paper photographs, to be a compound of silver or a suboxide of silver with organic matter. This I think I am in a position to prove by a very complete set of experiments, which I shall take an early opportunity of laying before the Society. Assuming it at present as an established fact, the action of sulphur may be stated as follows:—it unites with the silver in virtue of superior affinity, displacing the organic part of the compound. This organic matter on its liberation absorbs oxygen, or is otherwise modified, leaving the silver combined with sulphur in the form of sulphuret of silver. The impression is then *faded*, the quantity of silver present not being sufficient to give the requisite amount of opacity when existing simply as *sulphuret*.

It can be shown satisfactorily that the faded and yellow photographs consist solely of sulphuret of silver. I have mounted

* The sulphuration must be pushed to a considerable extent, in order that the subsequent yellow degeneration may be perfect: the action of ammonia, cyanides, &c., in accelerating it, presently to be noticed, probably depends in part upon their dissolving a portion of the image not combined with sulphur.

† In the second experiment, a minute bubble of air was accidentally allowed to creep between the mercury and the sides of the glass; in that case half the paper changed to yellow, the other part retaining its original color. The *red tint* of the paper did not appear to be much affected in the sulphuretted hydrogen containing no air; hence it is doubtful whether any sulphuration took place.

‡ Many will doubtless have noticed the *yellow finger impressions* on old sulphuretted prints; these may be caused by a trace of organic acid (lactic acid?)

six specimens which appear to me to establish this assertion beyond doubt. Each print was cut into two parts, one being immersed in dilute solution of hydrosulphate of ammonia until thoroughly faded, the other treated first with chlorine-water until all traces of an image had disappeared, and subsequently with sulphuretted hydrogen to convert the white chloride of silver into sulphuret of silver, and so redevelope the picture. When mounted together upon a card, the two halves of each print are found to correspond exactly, both possessing that yellow tint which is the characteristic color of sulphuret of silver in a fine state of division.

Comparative permanency of Photographs.—Having, as I believe, established the true theory of fading by the joint action of sulphur and air, I pass on to speak of those modes of printing which are best fitted to give superior permanency under this injurious influence.

The manner in which the prints were prepared in these experiments, and their division into halves before being submitted to the application of the test, having been fully detailed in my last paper, need not to be recapitulated. All the specimens are mounted upon cards and placed on the table for your inspection.

The general results obtained are these:—*Developed* positives are as a rule superior to those printed by direct exposure to light; but very much depends upon the nature of the negative process which is followed; and hence no general statement can be made which will not be liable to many exceptions. The mode of conducting the developement must not be overlooked. The prints, which become very red in the hyposulphite fixing bath from the action of the developer having been stopped at too early a period, are often sulphuretted and destroyed even more readily than a vigorous sun-print obtained by direct exposure to light.

A point of even greater importance is *the nature of the sensitive surface* which receives the latent image. It is the print *developed upon ioidde of silver* which especially resists sulphuration. In this case, not only is the preliminary toning effect of the sulphur more slow than usual, but the impression cannot be made to fade by any continuance of the action. It loses much of its brilliancy, and is reduced in intensity, but it is not so completely destroyed as to be useless. In a future paper on the formation of the photographic image, I shall show that the actual amount of silver in the image developed upon iodide of silver is considerably greater than when bromide and chloride of silver are substituted. There is, in fact, enough of the metal present to form an image, less intense than the original, but of a respectable brown tint, even when separated from the organic matter and existing in the form of sulphuret of silver. This property of the iodide-developed prints is one of such importance that it ought not to be neglected. It has been objected by some that pictures developed on iodide of silver are dull and inky; but might it not be possible to obviate this by combining the iodide with organic matter of a kind which is known to *redden* the reduced surface? This has indeed been already attempted by Sir William Newton, who dissolves the iodide of potassium in serum of milk containing *caseine*, and thus obtains a double advantage, as was evidently shown by the specimens exhibited in the two cases sent by me to the Photographic Exhibition, and intended to illustrate the action of sulphur and oxygen respectively upon positive prints.

The difficulty with which sulphur is absorbed by photographs developed on iodide of silver is also proved by the following experiment:—A polished daguerreotype plate was suspended, together with several half-prints, in a large jar containing air purposely mixed with a trace of sulphuretted hydrogen vapour. In the course of a few days the silver plate had become yellow and tarnished, the sun-prints were toned to a darker shade, but the iodide-developed print remained *unchanged*.

In applying the solution of hydrosulphate of ammonia to paper positives prepared by the negative process described by Sir W. J. Newton in the second volume of the photographic Journal, p. 176 (1 grain of a soluble bromide to the ounce of water), and also by that of Mr. Sutton in the same volume, p. 212 (serum of milk containing caseine), it is evident that they are sulphuretted far more readily than positives developed on iodide of silver; indeed, unless the action of the gallic acid is pushed to a considerable extent, they become yellow almost as quickly as ordinary sun-prints.

After a careful examination of those specimens on the cards which were printed by direct exposure to light, I do not perceive that the albumen proofs escape the deleterious action of the sulphur more than others. The property of albumen in protecting the image from oxidation, which subsequent experiments have shown to be even more marked than was at first supposed seems to be lost when, by the action of sulphur, the union between the silver and organic matter is destroyed. This result accords with the practical experience of photographers; since it is evident that albuminized proofs perish as quickly as those on plain paper when both are imperfectly freed from hyposulphite of soda.

With regard to the effect of *gold* used as a toning agent, it is undoubtedly to some extent a protection to the print. The employment of this metal, however, does not render a simple sun-print at all equal to a positive developed upon iodide of silver. The deep shadows of the picture are indeed, often protected by the gold, but the lighter shades not so perfecty. Hence, after the sulphur has acted, in place of the universal yellow and faded aspect presented by the simple untoned print, you have, in the case of the positive fully toned by gold, black shadows with yellow half-tones. Therefore, whilst recommending the use of gold as a toning agent, it does not seem advisable to lay too much stress upon it as a certain preservative from the destructive action of a sulphuretting atmosphere.

A superficial coating of wax, applied by brushing the print over with white wax dissolved in æther, is, as might be anticipated, beneficial. The evaporation of the solvent however, leaves the wax in a somewhat porous condition, and hence the sulphuretting liquid is absorbed by degrees, and eventually destroys the print.

In my next paper it is intended to treat of the behavior of paper positives with chlorine, bichloride of mercury, and other substances of a destructive nature.

Sir William Newton.—Mr. Hardwich has stated that positives by development fade as much as positives taken in the usual way. There is one mode in which it may be prevented, viz. by not exposing them too much to the light, but allowing a longer time for development. In such cases I believe they never fade, and I think Mr. Hardwich has tested that in some specimens he has received from me; I may say that I have substituted gelatine made from parchment, and I also made use of a gelatine made from the fine sawdust of ivory, both of which I like very much better than the whey, inasmuch as they impart much greater strength to the paper. Whey makes the paper sensitive, but does not give it strength.

Mr. Hunt—The Photographic Society and the Photograhic public are infinitely indebted to Mr. Hardwich for his admirable reseaches in photography. I have but one remark to make with regard to a paper he is about to bring before the Society, and I venture to do so with a full conviction that at the present moment Mr. Hardwich is mistaken. Mr. Hardwich informs us, that he believes that a darkened surface is a subchloride of silver; I am perfectly convinced that it is silver in a metallic state. It is quite true that in the collodion process upon paper, where we have the complication of the organized condition of the paper itself and the organic matter of the size, that we may have in one of those numerous combinations an organic matter with the silver that is present. If we take perfectly pure chloride of silver and precipitate it upon a glass plate, we know that the change that takes place is a faint one; but if we take nitrate of silver which is dissolved in water, absolutely free from organic matter, and drop a little of that nitrate of silver in solution upon our chloride of silver upon the glass plate, the combination of chloride of silver and nitrate of silver will darken to a deep chocolate brown. If you examine the progress of that, you will find that after the first darkening comes on, the darkened surface will dissolve in ammonia, and there is very little doubt that

oxide of silver is upon the surface. But if you allow the solar influence to go on a little further, you will find that the darkened surface will not dissolve in ammonia, and therefore that there is something besides oxide of silver. Then again add to the darkened surface nitric acid, and you will find that the darkened surface is dissolved in nitric acid and that you have red fumes in the tube. I believe, therefore, that when we get rid of the complication which depends upon the presence of the paper and the size, we shall find that the darkened surface is absolutely metallic silver. Upon that belief I ground an assertion that I have repeatedly made, and which I again repeat, that a photogrph, if properly prepared, need never fade; that it is only carelessness on the part of the photographer which leads to the failure of photographic printing. I have by me at the present time some pictures that were presented to me years ago by Mr. Fox Talbot, and which are as good as when he gave them to me. I have pictures of my own that have lasted an equally long period without showing the slightest indication of fading. I have pictures of numerous other photographers that have been exposed to the action of the saline atmosphere on the coast of England, to the atmosphere of London, and to all atmospheric changes, and without change.

I cannot avoid mentioning, that the results to which I have referred and at which others have arrived, are precisely the results that were arrived at by that very eminent chemist Scheele, who first directed special attention to the influence of the solar rays upon chloride of silver.

Mr. Malone.—Before we separate I should like to make one remark upon Mr. Hardwich's paper. I believe it was my fate to have brought forward the fact that sulphur is a destructive element. I cannot omit mentioning that the experiments which I made about the year 1850, and which gave prominence to the fact, were made upon the sulphide of ammonium, and I had not then carried the experiments far enough to show that sulphuretted hygdrogen alone is sufficient to fade the picture. I believe the discovery of that is due to Dr. Percy.

Dr. Percy.—I disclaimed it long ago; that merit is not due to me.

AMERICAN ART—STATUE OF THE REPUBLIC BY MR. STONE.

Among the new works in progress at the studio of the distinguished American sculptor, Horatio Stone, which it has been my good fortune to examine, I have been especially impressed with the grand study of his statute of "The Republic," a conception which cannot fail to render the artist's fame secure. It is a work of remarkable strength in sculptural representation, and will be recognized by every American as a just and beautiful expression, in the language of art, of the essential spirit and life of the nation.

The work consists of a single figure—a man above the middle age—a well-preserved man, who looks as though he would never fall into decrepitude, or cease to grow stronger. There is manifest in his figure, bearing, and the lineaments of his face, the comprehensive type of the national man. He is in an upright position, in the act of moving forward, as is the case with the Republic which he so well personates. He wears the civic costume of the time of our revolution. His left hand grasps the emblem of control, the only sign of a sceptre an American sovereign would think of weilding, and makes him an equestrian without the necessity of having a horse in the composition: it is a bridle which he is taking from the handle of a plow standing before him in the furrow.

In his right hand he holds the great seal of the Nation, and those precious manuscripts which constitute the nation's heart and soul—the Declaration of Independence and the Constitution—which gave the Republic form, strength, and the vitality to endure. To these few accessory signs is only added the Executive portfolio, containing State papers to one of which is attached the national seal.

The work is treated with severe simplicity and entire freedom from affectation. From whatever point of view the figure is seen, the figure is seen, the combination and flow of lines are harmonious and effective. The atomical definitions are exceedingly fine and give the whole figure the feeling of mobility and vital action. The base of the statue contains a series of four groups in relief, designed to carry out illustration of the subject in the fullest manner. The one occupying the part of the base fronting the statue illustrates the establishment of the Government, and is thus designed: The inauguration of Washington is taking place. He is taking the oath of office. The people are setting up the symbolic insigna of the Republic, and directing the attention of the President to the Chair of Administration which they have erected for him, while his Ministers of State, Marshals, &c., are conducting away from the scene the bearers of the insignia of royalty—the British arms reversed, &c. This relief is a noble conception, and worthy of being wrought in colossal size for the principal pediment of the Capitol.

This statue of the Republic is designed to be wrought in marble of colossal size and to be placed in the centre of the Rotunda of the Capitol. The base or pedestal is to be wrought in bronze, and to contain within it a fire-safe casket holding the original parchment scroll of the Declaration of Independence. The work has the unqualified approval of the best judges in these matters, both citizens and officers of Government, and there is no doubt the artist will soon be commissioned to execute the work for the Capitol.—*N. Y. Daily Times.*

From La Lumiere.

NEW METHOD

By which Photographic Proofs may be seen in Relief.

Mr Editor,—In my letter of the 3d of January I mentioned a process for intensifying negatives, I now send you another communication concerning a method whereby the appearance of a Stereoscopic proof may be given to any kind of Photographic proof, this method was discovered by M. le professeur abbè Frederick de Zinelli of Venice who has been practicing it several years. The proof is placed on an easel or other support which keeps it in a vertical position. The day being fair arrange the picture from 8 to 4 metres distant from the window, and in such a manner as to receive as far as possible a strong light at one of its corners.

Examine the picture with a common Opera glass keeping at a suitable distance and endeavour by moving round to find the *true* point to stop. You will not always succeed immediately in setting the visual focus, and some according to the nature of their sight will be forced to practice with patience, but all will be rewarded for the fatigue and labour of their experiments on beholding their proofs assume the aspect of beautiful Stereoscopic pictures, producing effects in perspective and relief imitating nature to perfection.

The same thing may be done with drawings and other pictures. When they are well executed, the illusion is complete, and if the plans were wanting in the requirments of perspective we should be struck with their discordance with those which nature presents us.

When negatives viewed in this manner are of large dimesions, they produce an imposing effect, and edifices especially, which appear as though illuminated within.

Photographers would do well to study this method, and to dispose their works in such a manner that they may be submitted to this verification.

It would be well for this purpose to use papers of large size, the edges of which are of a dark tint. M. le professeur abbè de Zinelli thinks that in following out the method he indicates, the cutting of the edges which surround the picture obtained in the camera obscura, as is generally done, may be waived, because in this case, instead of impairing, they contributed on the contrary to produce the optical effect—the illusion. Amateurs in modern literature are certainly acquainted with the works published by M. Abbè de Zinelli on Dante, Galileo, etc. His enthusiasm for all that contributes to elevate the human mind leads him to consecrate to the culture of the arts the few moments of leisure

allowed him by his more serious studies of Theology and Philosophy. Accept &c.

Venice Feb 24, 1855. FRITS VOGEL.

From Notes & Queries.

ALTERATION OF POSITIVES.

The following article is extracted from a communication by M. M. Davanue, and Girard, to the "Académie des Sciences," on the subject of the alteration of positives. MM. Davanne and Girard commence by saying, that in speaking of the instability of positive proofs, they only mean those which are prepared in the ordinary manner with hyposulphite of soda, and not those in the preparation of which any of the salts of gold are used. The first of these processes, and the one hitherto most employed by photographers, as is well known, consists in first soaking the print in hyposulphite of soda, in order to dissolve undecomposed chloride of silver. It acquires by this the red colour which one endeavours to replace by the beautiful black violet tints that are obtained in the toning bath, composed of hyposulphite of soda, to which either acetic acid or hyposulphite of silver has been added. Everything that they had observed induced them to believe that a red proof, which has not been fixed in the toning bath, was formed by metallic silver, and not by sub-chloride of silver, as has usually been supposed;, that this silver, by contact with the baths above mentioned, is transformed into sulphide of silver, which is afterwards modified by the vapours in the atmosphere. Experience has proved the correctness of this hypothesis.

To verify this analytically, MM. Davanne and Girard endeavoured to ascertain firstly, what was the state of the silver in the positive, fixed, and not toned, examining incidentally if there remained any hyposulphite of soda in the substance of the paper. Secondly, what was the state of the silver on a positive proof toned in the usual way, that is to say, by means of the hyposulphites charged with chloride of silver or acetic acid, those baths which photographers call old *hyposulphites.* The process which they employed to effect this analysis was very simple; it consisted of impregnating the sheet of paper with a solution of nitrate of potash and carbonate of soda, burning it and submitting the ashes to analysis; after the calcination, the silver remained in an insoluble state, whilst the chlorine and the sulphur were transformed into chloride and sulphate. The accuracy of this process was first verified by burning a sheet of paper impregnated with chloride of silver, and determining the quantity of silver in the ash by chlorine, and the quantity of chlorine by means of silver, and weighing the two precipitates of chloride, they were found to be identical. In the same way the composition of the ash of photographic paper was determined, with a view to further analyses.

To decide the first question, a sheet of paper, impregnated with chloride of silver, was completely blackened by exposure to the light, washed in fresh hyposulphite of soda, then in distilled water, and finally burned; no trace of sulphate was found in the ash. The quantity of chlorine amounted to 0·002 grammes; that of the silver to 0·124 grammes. It was evident from this, in the first place, that the fresh hyposulphite of soda had left no trace of sulphur, and in the next place, that the proportion of chlorine was so small compared with that of the silver, that it might be considered as an impurity in the paper; the fromula Ag_2 Cl. would have required ten times as much, that is to say, 0·020 grammes. Several times repeated, this analysis always gave the same results. But before drawing a conclusion, MM. Davanne and Girard wished to give it a more palpable from. They prepared a considerable quantity of coloride of silver and spread it in a capsule, and exposed it to the light of the sun for a whole day, stirring it continually; it was washed with hyposulphite of soda, then with distilled water, and the residue, fused with pure carbonate of soda, gave a button of metallic silver, but the flux did not contain any traces of chlorine. It must be added, that the surface of a photographic print is perfectly soluble in acetic acid, whilst the sub-chloride is considered insoluble. From these experiments, it may be concluded that the positive photographic image is formed by metallic silver, and not by subchloride of silver, as has been hitherto supposed.

To determine, in the next place, what was the state of the silver on the toned proofs, they analysed a certain number, on which the desired black tints had been produced, by means of the ordinary toning baths (hyposulphite of soda mixed with acetic acid, or salts of silver), and not only was silver always found, but sulphur also; these two substances occur together almost in atomic proportions, such as are required in the formula Ag.S. This result is continually reproduced, and we may therefore conclude, that in the above-mentioned toning baths, the silver with which the paper is covered is transformed into sulphide,—a reaction easy to comprehend when we recollect that the hyposulphites are immediately decomposed by acetic acid, and, as experience has shown, these salts mixed with a solution of nitrate of silver are transformed almost instantaneously into sulphide of silver.

Proceeding from this to the study of prints that had suffered a change, they submitted to analysis some that had been prepared several years ago and of which the black colour had been transformed into yellow; these they had prepared themselves, and had washed them for several days with water, after coming from the toning bath; and also others that they had directly sulphurised. In each case they found sulphur and silver, and, what was curious, the proportions were the same as in the black prints coming from the toning bath.

It seems to be clear, therefore, that in prints that have merely been *fixed,* analysis indicates only the presence of silver, while in those that have been *toned,* whether they are black or yellow, there is both sulphur and silver, and these substances only. It remained to be seen whether this sulphuration was really the cause of the destruction of the image. In order to determine this, they sulphurised properly fixed prints, both by the photographic process, a bath of hydrosulphuric acid, and a current of sulphuretted hydrogen and in every instance where the sulphurised prints came in contact with moisture, the black tones rapidly disappeared and gave place to yellow, while those prints that had merely undergone the fixing process showed no change.

The concluion which MM. Davanne and Girard deduce from this is, that sulphuration is the cause of the toning, and, in, the presence of moisture, causes the destruction of the print. But that the employment of the salts of gold, which give rise to a totally different reaction, is productive of no mischief.

The question still remains to be investigated, why the black sulphide of silver becomes yellow in the presence of moisture. As there is no change in the proportion of the elements constituting it, we are forced to admit, either a hydration of the compound, or an isomeric modification, analogous to the red and black sulphides of mercury.

In conclusion, they state, that it is easy, when a print has become faded, to restore the black tones, which may be augmented or diminished at pleasure. All that is necessary is to immerse it for a few hours, and in the dark, in a bath containing two or three grammes of terchloride of gold to a litre of water; a double decomposition takes place, and the gold is deposited in the place of the silver. The chloride of silver formed, is then removed by a weak solution of hyposulphite of soda and the print washed; the picture will be found to be completely restored.

From the Jour. of the Phot. Soc.

ON A NEW METHOD OF PRINTING.

BY J. MAXWELL LYTE, ESQ.

[Read Feb. 7th, 1856.]

GENTLEMEN,—I presume it may be of some interest to this meeting to hear the details of a new method which I now employ for the production of positive photographs, and by which all chance of sulphuration is avoided, while at the same time the finest dark tones are secured to the proof without the invention of gold or other expensive preparation.

The process depends on the power which aqua regia posseses of destroying sulphide of silver, or any similar compound of sul-

phur converting the metal into a chloride, while at the same time the combined sulphur becomes sulphuric acid. The sulphur thus becomes soluble, while the silver takes the form of a chloride, and having thus got rid of the sulphur, we again darken the chloride of silver acting upon it with a combination of gallic acid and potass, which reconverts it to the black metallic state. Take ordinary positive paper; the papier Saxe is perhaps the most suited to the purpose, as giving the greatest fineness and most perfect definition; and having chosen the right side, lay that downwards on a solution of chloride of ammonium of 5 per cent. When it has thoroughly imbibed, lift it off, and hang it up to dry; then lay the same face down on a bath of nitrate of 20 per cent., and after it has been for at least five minutes in contact with this bath, again suspend it to dry.

Print the picture in the usual way, only let it be printed somewhat darker than will be ultimately required, as the after process tends rather to tone it down.

The print withdrawn from the pressure-frame must now be placed in a bath of plain water, in order to extract as much as possible of the free nitrate. Then in a bath of water in which is dissolved a little salt; this converts all the free nitrate remaining in the proof into chloride of silver, and from thence it is to be carried to a bath of new hyposulphite of soda of 25 per cent., to which has been added 0.5 per cent. of carbonate of soda.

Here it is to remain till fixed, which process may be deemed accomplished after it has lain for from a quarter of an hour to half an hour in the bath.

It is now to be thoroughly washed in several waters till all the hypo be removed.

The picture will now be most probably of an ugly red color, the more strongly so in proportion as the hypo is more freshly made; and if by age of the hypo the picture may happen to be of a better tone, then the presence of sulphide of silver in the proof always seems to threaten its destruction if left there, but the existence of which the following treatment obviates. The well-washed and still wet proof is now placed in a bath composed of aqua regia, 8 or 10 parts, water 100 parts; here it is seen rapidly to fade, and after a short time will have almost completely disappeared, the dark silver forming the picture having all become converted into chloride, while the sulphur, if any there is, is at the same time converted into sulphuric acid and dissolves out into the liquid. It is now transferred into a bath of water, to which has been added a morsel of carbonate of soda, or a few drops of ammonia, so as to get rid of the acid, and may then be placed in the following bath. Water 1 pint, gallic acid (saturated solution in alcohol) 2 or 3 drops, liquor potassæ 1 drop, to be mixed at the moment of using. In this mixture the proof rapidly darkens, reappearing in all its minutest details, and requires no further treatment than a slight washing in clean water, when it has arrived at its maxium of intensity.

I may here add a few remarks. The paper employed for the process should not be sized with gelatine, albumen, or any animal preparation, but with the vegetable preparation used for the machine-made papers which are made on the continent.

The bath of gallic acid absorbs oxygen very rapidly from the atmosphere, becoming red, so it soon spoils; therefore the ingredients should not be put together until the moment when they are required for use. The small quantity of these substances used at each time prevents all question as to expense, and the time employed in producing a picture scarcely, if at all, exceeds that demanded by any other process, long as this description may appear. No doubt many other forms of the same process may be employed, and some possibly with advantage; so, for instance, hypochlorous acid produced by the addition of a strong acid to an alkaline hypochlorite, answers equally well with the aqua regia, or the mixture of chromic and hydrochloric acids; in fact, any compound which readily yields up its chlorine may be used. This method is of course equally applicable for the treatment of positves made by the negative process, *i. e.* development; but to my idea this last-named process possesses one great disadvantage, viz.; our being unable to watch the progress of the printing, and thereby to stop it at just the right point, a condition absolutely necessary to the production with certainty of perfect positives.

As the above mode of printing abstracts all the size from the paper, it is necessary either to resize it, or, what is far preferable, to rub it over with an encaustic. A very good composition for this purpose is thus prepared:—Take some white wax and dissolve it in turpentine to form a mixture of about the consistence of pomatum, and add to this a quantity of alcohol equal in bulk to half the turpentine employed. Having then fixed the proof either into a frame for stretching drawing-paper in, or having pasted it on a peice of paper and fixed it down, rub into the face of it the paste of wax, &c., and as quickly rub it off with a bit of clean flannel. Enough of the wax remains on the face of the picture to render it beautifully bright and clear, and at the same time to render it impervious to air and moisture, and it may be cut down and mounted.

Lastly, as each paper sensitized extracts from the bath a certain amount of nitrate, it becomes necessary to add, for each whole sheet or number of small sheets equallizing a whole sheet, which have been sensitized, 1 drachm of nitrate of silver in crystals, adding at the same time water to make up the quantity of the liquid to its original volume; and also, to avoid loss by the drip from the paper when hung up, it is well to draw its lower surface, *i. e.* the side which has lain on the bath, over a glass rod held in an oblique position, in such a manner as that the liquid which it scrapes off from the face of the paper may fall back again into the bath.

J. M. Lyte.

From La Lumiere.

NEW PROCESS FOR FIXING POSITIVES WITH CHLORIDE OF PLATINUM.

BY M. E. DE CARANZA.

M. Floures, Perpetual Secretary to the Academy of Sciences, presented to the meeting on Monday last an interesting communication from M. de Caranza, a manufacturing engineer in the Ottoman Empire and one of the Commissioners of the Exhibition of 1855.

Having been charged with various scientific missions during the course of eighteen years, as well at Constantinople as in other parts of the Ottoman Empire, M. Caranza devoted to photography, in which he is a zealous amateur, the leisure time allowed him from the important works going on under his charge

Having practised from their very commencement the various photographic processes in a climate so different from our own without any other guides than the works of Messrs Legray, Balders and other masters—deprived of advice, without comparative terms, forced to make himself a position of his own chemically—this skillful chemist owes his success solely to persevering study and a firm will to vanquish the numerous difficulties which untoward circumstances caused to spring up at each step.

It will be interesting to know that for a long period M. de Caranza has been occupied with the grand question of the fixing of the proofs, and it is a great pleasure to receive from him this disinterested communication of a new process concerning this important discovery.

The process is as followes:—

The positive is allowed to print in the presure frame until the white attains a violet tint, and the chloride of silver in the darkened parts has passed to the metallic state. The proof is then withdrawn from the frame and completely immersed in a pan containing the following solution.

Distilled water, ...	65 ounces,
Chloride of Platinum in the syrup state	0. 39 cubic in.
Chlorohydric acid........................	465 grains;

After a few seconds immersion the proofs assume a blueish grey color, the metallized parts become black, and the mezzotints clear up; the proofs must not be withdrawn from the solution until it has acquired the effect it is to possess when all the operations have been gone through with.

Then immerse it in a vessel of water and wash it six or eight times taking care to change each time; the fifth time a small quantity of chalk may be added; leave the proof in the liquid about two minutes stirring it constantly. The object of this operation is to neutralize whatever acid may remain in the texture of the paper. After which, wash again with pure water. The whole of this operation should take place in diffused light so as not to discolor the proofs, then immerse in the following solution of hyposulphite.

Hyposulphite,	1550 grains;
Distilled water,	11 oz.

As soon as the proof is plunged in this solution of hyposulphite, it assumes a vigorous black tone, and the mezzotints attain a roseate color which gives an extraordinary harmony to the entire proof.

A quarter of an hour is sufficient for drying, and the proof after immersion in water is completed. By this process the tone of the proof veers off in less than a quarter of an hour to the artistic black of an engraving, the mezzotints preserving the most delicate details; but the stability of these proofs is without doubt the most important fact in the process. A number of these proofs presented to the Academy over two years and a half ago, have not experienced the slightest change.

Proofs heretofore fixed with chloride of gold have an unfavorable blueish aspect, and in the course of time undergo very perceptible change which gives them a very disagreeable soiled appearance, not inherent to chloride of platinum. This process posesses an extra advantage in the reduction of the net cost of proofs, the cost of chloride of platinum being about one third that of chloride of gold. The results obtained by M. de Caranza are remarkable for their beauty of execution. His negatives on waxed paper are distinguished for delicacy of detail, transparency of shades and a truthfulness in perspective which renders his pictures truly exquisite. The most striking peculiarities of these drafts are the boldness of contrast and the shade with which they are rendered. We have for instance in juxtaposition to a mass of dark foliage, the white walls of palace or mosque, effulgent with light. But in the darkest parts as well as the most illuminated not a single detail is lost. In fact it would seem that for M. de Caranza, the lights and shades, while retaining their proper value, exercise an equal action on the prepared paper. These views can only be compared to the warmest paintings of Decamps; they produce effects and possess characters rarely seen in photographic proofs. As to his positives their delicacy and harmony of tone, giving them such an artistic aspect, are due to the fixing method employed by this artist. It may be added that most of the views taken by M. de Caranza, in conjunction with his friend M. Chas Labbè a painter, represent the Grecian convents of Mount Athos. The interest attached to the wild unsurpassing situation of the *Holy Mount*, the animated and picturesque architecture of the convents, which like eagle's nests crown the more elevated ridges, and even the very nature of the soil, make this collection one of the most valuable ever known.

L. T. L.

From the Jour. of the Phot. Soc.

WAXED PAPER PROCESS.

To the Editor of the Photographic Journol.

Sir—As a regular subscriber, may I ask room for a few words on the waxed-paper process, believing that independently of the facilities it affords to tourists, it is capable of producing more *artistic landscape* than collodion, in all cases except where the subject is minute architectural detail?

In this process the iodizing is a point of great importance; and after trying many formulæ, I gave preference to that of Mr. Townsheud (Phot. Journ. vol. i. p. 219), and used it for some time with success, but still thought it capable of improvement by the addition of some organic substance. Some acquaintance with chemistry led me to seek a more suitable one than had been tried, and finally to fix on *pure urea*, which will I believe, prove a valuable photographic agent, giving great evenness and some increase of sensibility. The formula in which I employ it is—

Water	10 oz.
Iodide of potassium	100 grs.
Bromide of potassium	30 grs.
Pure urea	30 grs.
Free iodine sufficient to produce a sherry color.	

Bromide of ammonium may be substituted for that of potassium, and is perhaps rather preferable in point of sensibility.

Paper prepared with this liquid, and excited with a 30-grain solution of nitrate of silver containing 1 drachm of acetic acid to the ounce, I find capable of producing excellent negatives. With a single achromatic lens of 3 inches diameter and a stop of $\frac{1}{2}$ of an inch, about ten minutes' exposure in a good light is sufficient even for foliage, the detail of which is very well made out. Of course this is an average time, and must be varied according to circumstances, but it will hardly require to be exceeded.

For developing, I use a saturated solution of gallic acid mixed with an equal quantity of the water used for washing the excited paper; and when the picture is fully out, adding to about 6 oz. of the mixture $\frac{1}{2}$ a drachm of the aceto-nitrate to increase the intensity.

I shall be glad to learn that some professional photographer has tried this, and to find that it is successful, being myself only an amateur practitioner. A really good *poper*, especially one entirely free from metallic impurities, is still a desideratum, and seems all that is wanted to secure uniform success. Canson's and the Papier Saxe appear at present the best that are procurable, but my failures from their defects outnumber those from all other causes together.

Yours respectfully,

Aliquis.

From La Lumiere.

ON THE ACTION OF DIFFERENT GASES Upon a Plate coated with the Heliographic Varnish composed of Bitumen of Judæa.

BY M. NIEPCE DE ST. VICTOR.

It is well known that my experiments proved what M. Chevreul foresaw, namely, that the heliographic varnish does not undergo any alteration *in vacuo* although exposed to light; it remained to be ascertained which of the gases entering into the composition of the atmosphere exerted the greatest action. *A priori*, one might say it was the oxyde of the air that acted upon the heliographic varnish, producing oxidation, as in many other substances.

I can now affirm that it is really the oxygen which acts, for it follows from comparative experiment made by me at the *Gobelins*, under the eye of M. Chevreul, that oxygen has in every case acted more powerfully than air, while the results of its action have not been very different from those obtained in the open air.

Hydrogen gave no results, as was the case also with pure nitrogen.

Hence it is very evident that oxygen is indispensable for the production of photopraphic phenomena upon organic substances.

On the other hand, in operating with inorganic substances, such as the salts of silver employed in photography, atmospheric air plays no part at all, for all the compounds of silver are blackened by light even *in vacuo*. I have been unable to established any notable difference; but if I admitted one, it would be rather in favor of the vacuum.

Such are the results I have obtained in repeating the same experiments a great number of times, and in operating under the most favourable conditions possible; for I have been greatly aided by M. Decaux, assistant to M. Chevreul at the *Gobelins*, whose name I am happy to mention here.

Observations on the different actions Air and Light exert upon Benzine and the Essential Oils.

I have mentioned in the first part of this memoir the action of

air and light upon the heliographic varnish in the liquid state; I think it desirable to give the results of some observation on this subject.

Atmospheric air alone acts upon benzine differently from air and light acting together; whence it results that the benzine may be strongly colored by the influence of air alone, if the distillation has not completely removed from it the resinous or bituminous matters it contains; but is only oxygenized or oxidized under the combined influence of air and light. If the benzine has been distilled several times, and in this way all foreign matters it contained have been totally removed from it, it will no longer become colored under the influence of air, even with the action of the light combined; it will not suffer oxidation, at least after a very long exposure, and in any case will only be feebly oxidized; we may say it is almost inert.

Benzine may perhaps be employed in this state for the preparation of a heliographic varnish; but under these circumstances a very much longer exposure of the varnish to air and light will be necessary, since the sensibility will then only depend upon the bitumen of Judæa and, especially, the essential oil.

The essential oils behave in the same way as benzines, only there is very great variation in the time necessary to influence them by air and by light combined. The difference exists not only between different kinds of essential oil, but between samples of the same kind. Such are the observations resulting from my experiments, and which I have considered it my duty to communicate to the Academy, because they appeared to me to possess a certain amount of scientific interest.

From the Jour. of the Phot. Soc.

ON POSITIVE PRINTING, &c.

To the Editor of the Photographic Journal:

Sir,—If you will permit me, I will offer a few words of reply to the letter of your correspondent " Middle Tints " on the subject of the preparation of some papers.

There is no necessity for washing the rennet so thoroughly as " Middle Tints " describes; a small quantity of salt remaining in it does no harm whatever ; in fact, in this dull weather, it may be necessary to add a small quantity of some haloid salt, in order to increase the sensitiveness; but when this is done, the sensitive papers must be *most carefully* guarded from the light, and there is then no risk of the gold dust imparting a cold inky tint to the proof. When we give up old hypo salts as a relic " of the dark age of photography," (I quote from Mr Shadbolt's last paper), we must take care that in avoiding Scylla we do not fall into Charybdis, and obtain proofs which are too cold in tint, and resemble moonlight effects. With respect to superficial printing, I am sorry that Mr. Shadbolt should have misunderstood my meaning, when I was endeavouring to advocate the importance of impregnating the papers deeply with the chemicals. I never intended it to be understood that this was to be done *at the expense of the state of the surface.* Unless a certain condition of the *surface* chemicals is observed, the print will appear to be *sunk in the paper*, and altogether faulty. This effect does not seem to me to depend so much upon the employment of this or that formula, as upon the observance of certain laws which affect capillary action. With the *same* paper and the *same* bath, it is possible to produce very different results as regards brilliancy and definition. If, for instance, I *dry* a sheet of paper carefully, and then float it for a *few seconds only* in a bath of albumen (properly and thoroughly beaten up), I obtain a much greater amount of glaze then if I take a *damp* paper and float it for *several minutes* in the same bath. I merely mention this as an *experiment*, and the same will be found to be more or less true of baths in which other organic substances are present. Nevertheless, total immersion (as I have recommended in my book) will give good results, with the paper that I was employing at the time of publishing it.

We should not, therefore, abandon any mode of printing which may sometimes fail, not so much from anything faulty in the formula, as from the non-observance of certain physical laws of capillary attraction, and which a series of careful experiment would determine.

The merits of printing by development appear to me to be these:—

1st. Not only may the proper condition of the *surface* chemicals be obtained, but *the pores of the paper* may also be filled with darkened material, which is impossible in the case of sunprinting, as I have on a previous occasion endeavoured to explain.

2ndly. The darkened material of a developed print is found to get still darker by time; at the same time that the lights, by undergoing a slightly bleaching process, improve to brilliancy,—so that a developed print IMPROVES BY AGE. It is singular that this circumstance should have been stated for the *first* time in your Journal for October last. It was mentioned by me in my advertisement in that Number, and also by Sir William Newton in his letter on printing by development. His words are :—" They (the prints) have, on the contrary, invariably improved, not only in colour, strength, and clearness, but I have frequently observed *after months*, that some of the tender parts have become more developed ; this may arise from the use of *gallic acid* in the *negative* process, which I have invariably pursued."

The theory of photography being as yet in its infancy, we cannot attach too much importance to FACTS. We have in the above quotation the testimony of Sir William Newton ; and I have fearlessly placed before the public the statement of Blanquart-Evrard to the second effect, viz. that developed prints IMPROVE BY TIME. Those two gentlemen are I believe, the only eminent photographers who have, for a series of years past, employed the process of printing by development; and the conclusions at which they have arrived are the same, viz. THAT DEVELOPED PRINTS IMPROVE BY TIME.

3rdly The method of printing by development is available at all seasons, and in all states of the weather. I have myself witnessed, very recently, the exposure and development, complete, of 250 prints with *one* pressure-frame, in the space of one hour and fifty minutes; and of these 250 prints only thirteen were rejected as unfit to offer for sale ; so that the process is practically applicable to the business of a large establishment.

Three gentlemen of the printing Committee have now testified to the merits of my test of sel d' or, and five out of the seven have testified to the advantages of gold as a colouring agent. Mr. Shadbolt also talks of the " vulgar glare " of albumen, and of the old hypo-baths, as belonging to the " dark ages of photography. " It is a source of gratification to me to find that these principles are gaining ground. By and by, we shall advance a step further, and more will be said of the modê of printing by development. I feel sure that it will come to this sooner or later.

As I am no longer an amateur photographer, it would be a want of etiquette in me to say more on this subject in the body of your excellent Journal; but the fact is, I have *very much* to say ; and the only difficulty is to know in what form to put it.

Now with respect to calotype paper.

I really believe that a certain *thin* paper made by Hollingworth is the best ; but it must be ordered expressly, and not used for three months. There is none in the market. I get what I have of Messrs. Ackerman, in the Strand, and it answers capitally. It is the very same paper as that which was employed to illustrate my " Calotype process." It has, however, the fault of not being entirely free from spots; but it *is* entirely free from the generally blanketty appearance peculiar to the *thick* Whatman paper. I enclose you a negative in proof of this. This negative was taken by me in Rome three years ago, on paper given me by M. Flacheron of that city, and whose works are well known as being certainly among the best that have ever been produced no paper. It is the same kind of THIN Hollingworth paper that I have described. The spots are, I believe, particles of metal detached from the brass cylinder which rolls the paper in the last stage of its manufacture. If your readers will order the paper *un*rolled, and will then send it to a copperplate printer to be rolled with the proper precautions, that the metal may not touch the paper (putting it between highly glazed millboards), they will avoid the spots.

I will conclude a lengthy epistle with a hint to the makers of photographic apparatus. If they will manufacture a cheap case, in which glass negatives may be safely transmitted by post, they will confer a boon on photographers.

I am dear Sir,

Yours faithfully,

THOMAS SUTTON.

P.S. I beg to remind Mr. Shadbolt that I never objected to albumen on the ground of its giving to the lights the " exact colour of cheese. " I have no objection to the colour (or to any of the other qualities) of "cheese " in *moderation.* When the yel-yellow tint of the light lies on the *cold* side of the yellow towards a green, it is, I think, objectionable; but when it lies on the *warm* side towards a red I think it highly beautiful.

There is all the difference in the world, in an artistic point of view, between the colour of brimstone and that of cream.

A propos of albuminized prints: they do not look so bad when framed behind a glass. If prints are to be varnished, in order to preserve them from the sulphuretted hydrogen in the London atmosphere, why not attach them to glass with cement, in the maner that I described a year ago, and which has been practised by Mr. Stone of Brighton? If any one will lay a *wet* print face downwards on a glass, and then look at it *through* the glass, he will see how nice it looks. Mr. Stone employs gelatine. I tried albumen, and a variety of other experiments might be made. The albuminized proof does not look so outrageously vulgar behind a glass. A print on plain paper may be dead, foggy, inky, sunk in the paper, &c. &c. ,but in its most unhappy state it does not look *vulgar*; there is always a certain *sentiment* about it, even in its very worst phase of failure.

SIR W. J. NEWTON'S PRINTING PROCESS.

To the Editor of the Photographic Journal:

SIR,—Having been requested by several persons to publish in the Journal the mode I persued with reference to those positives which were tested by Mr. Hardwhich, and which were suspended for a short time at the Photographic Exhibitions, I have much pleasure in complying with the the request, more especially as I think that it is now proved, beyond a doubt, that positives taken by *Development are Permanent*, with proper care in cleansing

I proceeded in the following manner, viz : to each ounce of camphor whey add two drops of the oil of cloves, shake well, then add 1 grain of bromide of calcium, 1 grain iodide of potassium, 1 drachm of a saturated solution of gallic acid and 20 grs. of white sugar; shake well together and filter always before using. Brush the paper over with the above, lay it flat to dry, and then proceed in like manner with the other side; and when perfectly dry, excite with 25 grains of aceto-nitrate of silver, blot off, and expose it to the light in the printing-frame from ten seconds to a minute; develope with gallic acid and aceto-nitrate of silver, put it into hyposulphite for about an hour, then into alum water for the same time, and then into two or three entire changes of water. The foregoing mode is that which I adopted with reference to those tested by Mr. Hardwich; but as I considered that the use of whey did not impart any *strength* to the paper, I have, therefore, since made use of a gellatine instead, produced from the fine sawdust of ivory and also from parchment; this latter I find is much to be preferred, and it may always be had fresh and pure of Mr. Barnard, 339 Oxford Street, near Argyle Streeet.

The mode of proceeding is as follows, viz. melt the gelatine and add an equal part of camphor water, and then two drops of the oil of cloves to each ounce of the liquid, *shake well together*, when it will have the appearance of milk or whey ; then add 1 grain of bromide of calcium, 1 grain of iodide of potassium, and 20 grains of white sugar to each ounce of the above, and *shake up well*; brush the paper over on both sides as before described, *being very particular always to filter before using; having gently warmed the mixture*, excite, &c. as above described.

I beg to add, that since I have seen Mr. Hardwich experiment with alum water, instead of using a weak solution, I now use a strong one, viz. a tablespoonfull of powdered alum to about three pints of water, and I find that the effect is not only to remove the hyposulphite, but to act as a *toning* agent; and in order to establish this fact, I have purposely produced a very red colored positive, and having submitted it to the hyposulphite, I then let it remain in the alum water until it has acquired the color I wish; and in some instances it has remained as long as seventy-two hours, after which Mr. Hardwhich kindly submitted it to his test, and no great change took place. I do not state this with any idea of recommending it for adoption, but merely to show that I consider the use of alum as important, at least in the *developing* process. My practice is, however, to produce the color I want by *development only*, so as not to require the use of alum for any other purpose than to remove the hyposulphite and other impurities, as well as to assist in the *fixing*, which appears to me to be clearly the fact: but wether or not, it is manifest that *no harm* results from the use of alum, as witnessed by the tests made by Mr. Hardwich and before alluded to.

I find that Canson's, Rose's, and Marion's *negative* paper is very good for the purpose.

I have also been written to by members and strangers to publish my *whole* process in one paper. As, however, I have made no difference in preparing the *negative* paper in any one respect to that which is described in the first Number of the Journal, there is, of course, no occasion to do otherwise than to refer to that paper; the only *addition* is, that when the negatives are well cleansed as those described, and all the size is entirely removed, and dry, I then have them rolled and pressed by Mr. Woolly, in High Holborn; the object being to press all the fibres of the paper *closely together*, so that when it is waxed, it is almost as transparent as glass.

If I should not have made the foregoing clear, I shall be happy to answer any questions which may be required.

Yours truly,

W. J. NEWTON.

N. B. The oil of cloves has the effect of keeping the gelatine for a long time, in which the sugar assists.

From La Lumiere.

MEANS OF PREVENTING THE FADING OF PHOTOGRAPHIC PROOFS.

The change experienced by positive proofs has of late greatly excited the attention of photographers; it has been proved that the natural moisture of the atmosphere together with the residue of the wash keeps up a constant action on most proofs, causing the blacks to change to a light bay yellow.

I had before noticed this unfortunate result in proofs of M. Legray, on exhibition at the Worlds Fair in London in 1851. They remained about six months on the ground floor, about three feet above the ground without any protection, and must consequently it is true, have undergone powerful alterations of sun and moisture.

Since then it has been noticed that this imperfection was almost peculiar to proofs of a beautiful velvet black tone in their freshness, whilst red proofs experience no change.

To get a complete knowledge of, and to obtain a remedy for this evil, it is important to discover its cause, and for this purpose, we must study what passes during the formation of a positive proof.

To prepare a positive paper, we impregnate it with nitrate of silver. We then apply one side of the sheet to a bath of salt water; by this means, the sheet becomes coated with a very delicate film of chloride of silver, on the side in contact with the salted water; but in the substance of the paper, there is always some free nitrate. This should necessarily be the case, otherwise the paper would lose a large proportion of its sensitiveness, and the blacks would not be intense, as chloride of silver alone never passes beyond a slate blue gray.

Nitrate of silver free from organic matter, does not blacken

so much as is imagined, under the action of light; very likely it does not blacken it all when perfectly pure. As a matter of information, it may be noticed that very pure *unsized* paper is not perceptibly blackened by long exposure to light, after having moisted it with a fresh solution of nitrate of silver in distilled water.

Sized paper, on the contrary, blackens rapidly, this rapidity increasing in proportion as the natural or additional sizing contains an organic substance favorable, under the influence of light, to the decomposition of the argentiferous salt.

Sized paper, impregnated with nitrate ot silver, assumes at first a yellow tint which gradually passes to a foliomort. It is probable that the chloride of silver, imbued with free nitrate, as is the case in ordinary papers acquires a peculiar tendency to blacken; aside from this, the foliomort color, combined with the slate blue tone unites every requirement for the production of the black, as the first blacks are the result of the multiple superposition of the red and blue particles, from the fundamental reason that the color of bodies is the result of rays which have passed through their substance and are partially reflected.

As to the presence of nitrate of silver in the ordinary positive paper there is no question about it as regards one side, and the simplest reflection will prove that the other is none the less exempt.

However thin a sheet of paper may appear to be, its substance may be considered as a series of nets interlacing each other, the fine meshes of which, like so many minute canals, allow the saline liquid to penetrate into its substance; but the deeper the liquid penetrates, the less chloride does it contain, until at last it is nothing more than water, which may indeed dissolve the nitrate, but cannot change it into chloride. When the sheet is lifted up, the salted water drains from the surface, whilst the nitrate of silver, dissolved internally, gradually moistens almost the entire chloride.

If we wish to see more clearly the effect of free nitrate of silver, the following is a very simple method. Immerse a nitrated sheet in a salting bath kept in a vertical vessel, whereby both sides may be wet at once and the nitrate of silver completely saturated. It will be seen that such a paper is deficient in sensitiveness and can never produce a black tone.

In thus dwelling on the presence of free nitrate of silver in the common positive paper, my design is first to show its fundamental use in the production of black tones, aided as it is by the organic matter of the sizing, and also to prove the important part it plays in the fading of proofs by the reactions it undergoes in presence of hyposulphite of soda.

On immersing a picture after removal from the frame into hyposulphite of soda, it is certain that the paper still contains free nitrate of silver, which does not fail to produce a precipitate, which passes, as all must have noticed, from a yellow to black whenever a drop of hyposulphite falls into the silver bath, or whenever a piece of nitrated paper be touched with the fingers stained with hyposulphite of soda.

I say therefore that it is incorrect to immerse the proofs on removal from the pressure-frame into hyposulphite before they have been disembarassed from the free nitrate of silver; as such pictures, by neglect of this precaution, will not fail to collect sulphur and sulphuret of silver, which will afterwards react upon the proof, with the aid of moisture and light.

The best mode for removing the free nitrate of silver is to immerse them in a salt water bath before submitting to the hyposulphite. The paper, then dry, being plunged entirely in this bath, will retain no trace of the nitrate of silver, as soon as it is completely saturated. I cannot see in what way this operation could be a detriment to the proofs; all the chloride thus formed would immediately dissolve in the hyposulphite, without leaving a deposit. I have often worked in this way as a pure matter of precaution. I have not, however, made any comparative experiment to ascertain whether the fading of proofs was entirely owing to this cause. I leave this, to me, interesting question, to practical photographers, who are better able than myself to decide it. Are the blacks of proofs produced by disunited silver or by a combination of this metal with a neutralizer? It is my firm belief that the solid shades, whatever be their color, are of pure silver, and I am therefore led more than ever to prefer the production of pictures by a continuing process with gallic acid.

I published some years ago, in *La Lumiere*, the experiments I had made on a process of this nature. Previous to this M. Blanquart Evrard employed an analogous process which he still follows, with this difference, that he makes use of a very strong iodide, while I employ a very weak dose of chloride.

I remember well that my process was then considered very strange; since that period an English photographer has brought it up again, without however mentioning my labors, sometimes even quoting my own arguments.

To return—I arrive at this conclusion, that by a certain sizing, or better still, by the addition to the silver bath of a suitable organic substance, we will obtain a very sensitive continuating paper, which, on development with gallic acid, will give satisfactory proofs, and by simply washing plentifully with water, may be kept from fading, without the use of hyposulphite.

Such is the base of the researches I propose to undertake as soon as the fine wheather opens.

M. A. Gaudin.

PRACTICAL TREATISE
On the Employment of Commercial Papers in Photography.*

BY STEPHEN GEOFFRAY.

Translated from the French for the Photographic and Fine Art Journal, by W. Grigg, A. B.

ON THE DEFECTS OF PAPERS AND HOW THEY MAY BE RECOGNIZED.

§24. It is not my purpose now to describe the difference between positive and negative proofs, particularly as respects their preparation. I shall simply show under what conditions these proofs become valuable, in illustration of the subject in hand.

§25. Negative proofs require paper the pulp of which throughout its entire substance, is of the greatest purity, homogenousness and equality of grain, and the extension of which in the baths is perfectly regular. It should also be very transparent; it should refract the chemical rays truthfully without disturbing them, so that the lines of the picture may be perfectly correct and the mezzotints pure.

§26. Positives should be formed on the surface of the paper only†. Their appearance should vary according to the subject, from the greatest clearness of outline to the most artistic softness. The purity of the pulp and the beauty of its grain, are therefore matters of less importance; the surface of the paper alone need be scrupulously examined. It being unnecessary that the picture should be translucid, the power of the paper is of little consequence.

§27. What we know of the manner in which these commercial papers of what sort soever are manufactured, is sufficient to satisfy us as to what is wanting to carry out the purposes for which they are designed in photography.

§28. The defects of the paper may result either from its physical constitution, or its chemical composition. They are so numerous and their mode of correction so different in the various cases, that the photographer, if he wishes to work severally, and at moderate cost, should always endeavour himself to remedy whatever faults he may discern.

* Continued from page 67, vol. iii., No. 3.

† Those who have taken positives by the negative method of Blanquart Evrard, may have more particularly remarked that the more the substance of the paper is impregnated with the sensitive substances, the less beauty does the picture possess when viewed by reflection, although by transparency it presents great vigour. Neither is the durability of the proof dependent on its penetration into the pulp, but on the richness of the sensitive surface. The picture is, in fact, changed by the re-agents left in the paper, especially surphur, which can be retained by the pulp alone after the washes, the sensitive on the contrary, being very easily freed from injurious substances.

§29. Paper is a perfect vegetable felt. It is a substance compound of more or less minute fibres, interwoven in such a way as to form a stuff of greater or less consistency and solidity. It therefore presents a surface covered with capillary interstices, which render it permeable by liquids and gasses. This fact is advantageous and disadvantageous; disadvantageous as when the felting is not perfectly uniform in all its parts, the sensitive surface will be of unequal depth; stains will be produced owing to the accumulation of salts of silver in certain parts, etc.; harmony in the picture will be out of the question, and the value of the mezzotints will not be given. Advantageous, as the proof, if the negative, will present a depth and degradation of tone to which the sensitive substance by themselves have never yet attained, even when applied upon glass, as thick as they could be without danger.

§30. This requirement of a good paper, *i. e.* to be equally permeable, and absorbing the sensitive substances with great uniformity throughout its whole mass, is difficult to accomplish. Supposing even that manufacturers shall make up their minds hereafter, to use rags of the same nature and condition for the manufacture of any kind of paper, will the saturation of the latter by the machines ever be accomplished with sufficient perfection? Will the pulp always be spread by the cylinders in a sufficiently correct manner? and lastly, will the felting ever be sufficiently close and regular, to enable the photographer to dispense with their after improvements?

§31. Should not the mode of improvement consist, first, in a second sizing on the basis of chemical composition, identical with that of the paper?

§32. This sizing should form on the prepared sheet, a second sheet, covered, if I may so speak, with jutting points, which fit into the interstices of the latter.

§33. The consistency of the paper stuff should be augmented, in order that the latter may support the separating action of the baths.

§34. Lastly, the sheet should be glazed in such a manner as to receive an impression which shall possess satisfactory delicacy.

§35. Manufacturers and dealers are accustomed (a fact pregnant with evil consequences to us,) to place the paper under every cylinder, in order to crush the grains, and thereby to give a very beautiful appearance to rather coarse paper. The result of this glazing is to stretch the paper and level its grains in a manner highly injurious. On the one hand, the natural aggregation of its texture is deranged, and consequently its extension in the baths is very irregular. On the other hand, it is true that the grains are forced in and compressed so as to remove all asperities; but the paper is left riddled with very dense points possessing little permeability. From this it is evident, numerous evils must arise, the chief of which is a general spotting of the proof.

§36. Papers thus treated, have especial need of a second well composed size.

§37. For great prudence, it is well to sensitize the papers merely on the surface. By this method, excellent positive paper is obtained.

§38. For this purpose they must be rendered less permeable. Impermeable paper is always better for positive proofs. The less the pulp of the paper *imbibes* the liquids, the more beautiful are the results. Now, the sizes of the manufactory are insufficient in this respect. They are not less unfit for protecting the sensitive surface from the penetration of the air into the texture of the paper. It is necessary, however, to prevent the reducing action of this body.*

§39. We have said that the pulp of the paper is composed of cellulose in very nearly a pure state; now this substance is one of the most powerful reducing agents among bodies of vegetable origin.

If the preceding observations on the almost inevitable irregularity of the grain of the paper be recollected, it will be understood to what degree an unequal distribution of this substance, of this powerful substance, over the sensitive surface, will affect the regularity of the photographic image.

On the other hand, if the operator desires to employ a dry process, he should preserve his sensitive films against the decomposing power of the cellulose, by investing the fibres of the paper with a neutral envelope, or one at least which does not exercise too strong an action on the photogenic substance.

§40. This neutral envelope should also be antagonistic to the pernicious chemical elements, which in spite of the washes employed to remove them, still remain in the paper.

§41. There is another disadvantage attending the sizing in the vat or piles (which is practised to a large extent at the present day,) which can be remedied only by a fresh sizing.

§42. In manufacturing the paper, it is picked and scraped, etc.; and in every spot where this operation is performed, its power of absorption is augmented to such a degree, that those who practice water-coloring, always take the precaution to resize their papers.

Vat sizing has still another inconvenience. It requires sizes compounded of very powerful reagents, and if it be advantageous in giving to the whole mass of pulp the same composition, it often introduces destructive substances.

§43. In hand sizing, the size is generally simple; being composed of feebly alumenized gelatin, which, if manufacturers were at all attentive to our wants, might be employed in a very excellent and pure state. This paper also does not absorb at any of its points after sizing.†

§44. The number of substances outside of cellulose and starch, which possesses an almost identical reaction, photographically speaking, and gelatin whose presence is no great detriment,—I say the number of substances left in the paper, either by accident, lack of care in the maker, or unavoidable necessity in manufacturing, is very great. Let us see how they may be recognised in order that we may remove or neutralize them, nay, even put them to advantage. (Vide §22.)

§45. Metallic stains may be introduced into the pulp during trituration, under the nails of the hammers or the cutters of the cylinders, on account of the vats and different boxes employed in the operation being dirty; they may be found on the wire frames, under the pressure cylinders; they may have been produced by a deposit of dirt in the workrooms, etc., etc.

They may be recognised most generally by their lustre. They are sometimes, however, so concealed by the glazing, that they cannot be perceived by the eye. They do not, in fact, always present bright or rusty points, but also real grease spots. It will therefore always be well to make use of a proper acid in every case; certain salts will be produced which will easily wash off. The employment of an acid moreover, by rendering unecessary a subsequent bath of ammonia, will at the same time tend to purify the sheet from all greasy substance it may perhaps contain, either in the interior or on the surface. The presence of grease in the paper is easily explainable, by the frequent handling it undergoes, and the contact of the machines.‡

§46. In order to recognize the different substances introduced by the bleaching and sizing operations into the paper, and which still remain, the latter must be tested. It may then be modified according to the result or analysis, so as not to counteract the photographic operations.

* If collodion on paper is of such difficult employment at the present day, it is on account of the combined action of the cellulose of the paper, and the air on the surface of the cellulose of the collodion, while rendered so sensitive itself by alcohol and ether.

† Numerous eminent photographers have remarked, and they are not far wrong, that primitive papers possessed qualities superior to those in present use. Primitive paper was most generally sized after manufacture, and were not pressed in the glazing cylinders.

‡ Iron stains are very persistent, especially in the case of positives. They form black, isolated points, sometimes even black scales, which it is impossible to remove, without either destroying in the adjacent parts, the tint, or the outline of the picture.

Copper stains are less troublesome, as their color is not so decided; they are also more easily dissolved: the acid chloride of gold, often softens them down sufficiently to render them supportable. Zinc does not stain in spots; it simply deranges the vigour of the blacks, and sometimes renders the proof greyish in certain places.

The preceding defects manifest their effects under the action of the developing baths, and sometimes also in the fixing baths. Greasy substances derange the permeability of the paper, and effect the homogeneousness of the second sizing and the uniformity of the sensitive fibre; they may also, in their way, exercise a chemical influence over the latter,

§47. To detect the presence of acids and alkalies* in the paper, pour a few drops of the syrup of violets upon one of the wet corners of the papers. If the blue color of the syrup be changed to green, the paper is alkaline; if red, it has retained acids.

§48. Alum shows itself in the following manner: Boil the test paper in distilled water; filter the infusion, and pour in a few drops of ammonia. If a precipitate be formed, the paper must have been strongly alumuized.†

§49. To test starch sizing, pour a drop of an aqueous solution of iodine on the paper; the deeper the tone of the blue produced, the greater will be the proportion of starch employed.‡

§50. To detect the employment of gelatin, take an infusion of the paper, filter the decoction, and test with a solution of gall-nuts or gallic acid; precipitation of gelatin then takes places. It is well to recollect that gelatin is a slightly alkaline substance.§

§51. To know whether any lime in any state whatever, remains in the paper, the latter must be disintegrated by maceration. Add to the coagulated liquid a little nitric acid, filter and test with the oxalate of ammonia; if nitrate of lime form, precipitate it with oxalic acid in the oxalate of lime state.

§52. The presence of chlorine, is demonstrated by precipitating the infusion of the paper in distilled water with nitrate of silver. If the impression contains chlorine, chloride of silver will form immediately. We need not trouble ourselves much with this substance, as it is attended with no disadvantage in positive paper.¶

§53. As to resins, they may be chemically recognised by dissolution in the essences. The sizes which they form may be recognized by *feeling* the paper, which is peculiarly rough, and also by the slowness with which the latter absorbs moisture.**

§54. The waters used in the course of manufacture, notwithstanding the greatest precaution, and under the best conditions, allow, I say, divers salts; among which sulphates and carbonates predominate, to deposit in the pulp of the paper; and (in practice,) we can only recognize the bases of these salts. (See §51 and §55.) I regard also their removal as impossible, practically speaking. We must therefore content ourselves by rendering them inoffensive.

§55. Baryta, especially of late years, has been frequently made use of in the manufacture of paper, either for bleaching the pulp or for some speculative object. To test its existence in the paper, operate in the following manner. Digest a few grains of the paper in chlorhydric acid, add water and filter in a few hours. Chloride of barium is formed; precipitate the liquid with sulphuric acid, decant and test with slightly diluted acetic acid; if the precipitate does not dissolve, you may be assured you have sulphate of baryta, as nitric acid would make with lime, an acetate of lime, which is very soluble in water.

In case the precipitate be in the paper in the sulphate state, in order to recognise it, we should have to burn the paper, collect the ashes, chafe with half their weight of chloride of calicum; agitate the calcined compound in cold water, and pour off rapidly. The result is chloride of barium; precipitate this solution with sulphuric acid: then test as has been already said, with acetic acid.††

(*To be continued.*)

* It is well known that an excess of these, beside the detrimental re-actions it may exercise on the sensitive salts, has a tendency to cause a disaggregation of the paper, so as to render its manipulation impossible; it moreover lessens the durability of the proof.

† Alum being a double sulphate of aluminum and potash, a strong dose may be very injurious to photographic phenomena. All, in fact, who have made any experiments, well know to what degree the presence of these compounds of sulphur is detrimental in the baths anterior to development. The submission of a sensitive paper to a bath of water, containing a few drops of sulphuric acid, would render its development impossible.

‡ Starch is a substance very favorable to photogenic action; it combines with iodine with the greatest facility. It may be recollected that M. Niepce de Saint Victor, obtained his first results on glass film. This substance gives very beautiful blacks; starch papers are very rapid in their action. (See note 2, p. 12.)

§ Gelatin, is an excellent article for sizing fine papers; its reaction on the salts of silver, very slight at first, is besides highly advantageous for the production of beautiful blacks. Photographers know the results which M. Baldus has accomplished with this substance.

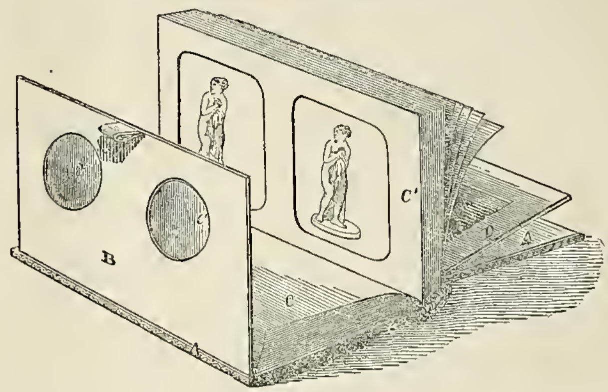
The action of gallic acid on gelatin is noticeable; it is especially to this action that we must attribute the delicacy of gelatin proofs.

¶ Chlorine has only one disadvantage, whether it is confined during the photogenic action, or remains in the free state (which is difficult.) It singularly retards the development of the picture in the developing baths, but in compensation preserves the whites.

** This sizing for collodion and albumen papers are highly superior; owing to their slight permeability. The sensitive remains on the surface instead of diffusing itself through the pores of the sheet as in ordinary papers. Almost all English papers are sized with resins.

†† Baryta is in itself extremely neutral as regards photography; excepting that it possesses some advantages, such as giving fine tones to positives, and beautiful whites to negatives. We think, therefore, that did it not introduce into the constitution of the paper a heterogenous, and frequently a badly distributed element, its employment need not be regretted.

MASCHER'S BOOK STEREOSCOPE.



The accompanying engraving presents a view of a most excellent additional improvement in Stereoscopes, for which letters patent were granted February 18th, 1856, to Mr. J. F. Mascher, of Philadelphia, the well known inventor of the "Stereoscopic Daguerreotype Case."

This Stereoscope consists of a book, in which the stereoscopic photographic pictures are permanently bound. A supplementary lid containing the two lenses is attached to the outer edge of one of the lids of the book, and a "supplementary back," or perforated mat, is attached to the inner edge of the back of the book

The object of the several parts will be more readily understood by having refereuce to the engraving. A A, are the two lids (or shell) of the book. B, is the "supplementary flap," containing the two ordinary convex lenses, b b, through which the two stereoscopic pictures are viewed, which latter are, by binocular vision, converted into one picture, possessing the well known characteristics of depth, solidity, and relief, for which the stereoscope picture has become famous within the last few years. This flap when not in use is folded within the book, which latter, when closed cannot be distinguished from an ordinary book. C C, are the leaves composing the book, upon which are photographic or engraved pictures. These leaves are no thicker than ordinary printing paper of good quality, and a gross or more of such pictures may be bound in a book of ordinary size and thickness.

The book now before us has blank leaves interspersed between the pictures, which are designed for written descriptions of each picture. Printed descriptions would evidently answer a still better purpose.

A large number of blank leaves are bound in the back portion of the book before us, which are intended to be cut for the purpose of allowing new pictures to be pasted in their stead, as they may be published from time to time; being in this respect similar to a scrap-book.

D. represents the perforated mat, furnished with gum elastic straps (not shown in the engraving) into which ordinary stereoscopic pictures, either daguerreotype, albumen pictures upon glass, or the common paper pictures pasted upon card board

may be temporarily slid, for the purpose of being viewed through the aforesaid lenses, b, b. This is a very simple, yet ingenious arrangement, which enables the book to be used, not only as a stereoscopic book *per se*, but also as a common stereoscope. Indeed the inventor has some of these books for sale, called by him "Skeleton Book Stereoscope," which he sells for 37½ cents each, in which the leaves are entirely absent. Again, stereoscopic, or non-stereoscopic books can be constructed, in which the paper pictures are entirely substituted by a number of the supplementary backs, into which daguerreotypes or other pictures are permanently fastened. In this manner, a daguerreotype case (book), may be made capable of holding a dozen or more likenesses.

From the above brief description it is presumed that the *modus operandi* of the book is understood. We will now make a few remarks as to the objects to which the book may be applied.

By the employment of a peculiar lens invented by the patentee, named by him the "Prismatic Lens," stereoscopic books can be made of any size, even as large as a quarto volume. Again, by the employment of the principles embraced in the Stereoscopic Locket, illustrated upon page 123, Vol. 2 No. 4, new series, of this Journal (also by this patentee,) books can be, made of the smallest size. They can be made so small that they can be carried in the pocket, or of a large and handsome size, suitable as an ornament for the centre table.

They may be used as picture books exclusively, or works of biography, natural history, voyages and travels, mechanics, &c., &c., in which the ordinary woodcuts are replaced by beautiful photographic, stereoscopic pictures. Or if the latter should be deemed too expensive, the stereoscopic pictures may be engraved in outline upon wood, which then, with the exception of the first cost of the engraving, will not cost more than the ordinary wood cuts. That the latter may be done is proved by the well-known "Wheatstone diagrams." We understand that the patentee is now making a series of experiments with a view of facilitating the engraving of stereoscopic pictures on wood. Photographic pictures are taken directly on wood, from which the engraving is directly executed in outline:—in outline, because it is well known that to engrave in lights and shades, is one of the most difficult things to do, if not impossible; whereas outline engravings are comparatively easy of execution.

With these outline engravings, it is proposed to illustrate works on mechanics, &c., which it is believed will be not only perfectly feasible, but will be attended with only a small additional cost; and where is the mechanic that does not know the advantage of having a MODEL instead of a mere drawing to look at? An ordinary drawing gives surface, depth, solidity, and cubical contents.

The book before us contains twelve beautiful interior and exterior views of the late French crystal palace, printed by the well-known artist, Richards & Betts, as well as some portraits of eminent statesmen and actors. The book with pictures, all complete, will cost about $3 50, or less than what the pictures were sold for prior to his invention, or about the same price for which a good Stereoscope, without the pictures, could formerly be bought.

For any further information relative to a supply either of books, separate pictures, or the sale of patent rights, for any particular publication, address the patentee, John F. Mascher, No. 408 North Second street, Philadelphia.

COLORING PHOTOGRAPHS IN OIL.

To the Editor of the Photographic Journal:

SIR,—I beg to trouble you with the following communication on the improvment of Photographic pictures by oil paint, trusting you will find a place for it in your Journal. I am convinced the process only requires to be known, in order to its general use by the trade; portraits of this style have all the appearance of a painting on canvas when properly finished.

The process is as follows: after the portrait is taken, pass a clear varnish over it on the color side, then paint with oil color very sparingly, keeping the shadows warm with a thin glazing of color. The process, though simple, is but as yet imperfectly understood by the trade, although practised by several parties in London, Edinburgh, &c., some of whom are making rapid progress towards perfection. I am happy to see the process in such general use, as it will be the means of preventing any person from obtaining a patent for it, which would thereby prevent parties obtaining a life-color likeness of friends unless at an exhorbitant price.

I am, Mr. Editor, your obedient Servant,

R. J.

THE NATIONAL ACADEMY OF DESIGN.

[We copy this article from the *New York Tribune*, as it meets our own views exactly.—*Ed. P. & F A. Jour.*]

Before we enter the grim-looking portal which opens to our yearly Exhibition of National Art, let us pause a moment on the threshold to consider what it is we are about to examine, that we may the better appreciate its merits, and be prepared to extenuate its defects.

Thirty-one years ago the first exhibition of the National Academy was opened to the public in a room over the bath-house on Chambers street, which stood on the site now occupied by Burton's Theatre. There had been an American Academy of fine Arts, the managers of which were, in part, non-professional; but the artists thought themselves entitled to the exclusive control of an institution designed to promote the cause of art, wherein, we think, they made an egregious mistake; for art is not for the benefit of artists, but for the world; and an institution designed to foster it and promote its growth, could best be manged by men who have a knowledge of affairs, and who would be wholly free from preference, jealousies, and fantastic theories and rivalries. Art has flourished most vigorously when artists have not been the managers, but the managed. However, the artists, to their own misfortune, in New-York, succeeded in killing the American Academy and in establishing the "National," and here we have its thirty-first Annual Exhibition. By an inspection of its works we shall come at a pretty just conclusion as to the wisdom of its founders and their fitnesss to conduct its affairs.

When the first exhibition of the National Academy was opened to the public, thirty-one years ago, Art was in its cradle in this country, and it is now, as far as the Academy is concerned, not a healthy infant, but a dwarf in leading strings. Since the National Academy took the Fine Arts under its special protection we have grown in greatness, wealth and splendor to a degree never dreamed of by our ancestors. We have now one of the largest and most superbly decorated Opera-houses in the world, built upon ground which was a cornfield when the first Exhibition of the National Academy was opened, and the whole of the Fifth avenue, with its two miles of continuous palaces, its club-houses and churches, was then a rural district occupied by country seats, market gardens and cow pastures. The best example of Gothic architecture we could then boast of was St. Thomas's Church on the corner Broadway and Houston-street; and we have Trinity Church and Trinity Chapel—splendid examples both of ecclesiological art nearly three miles apart, and yet in the crowded portions of the city. All our great hotels, with their profuse wealth of ornamentation, their sculptured facades and painted ceiling, have been built since then; our largest packet ships were then scarce five hundred tuns burden, and now we have ocean steamers of five thousand tuns, with more of artistic decorations in one of their cabins than our whole commercial marine and navy could then have shown; and three single buildings in Broadway now with more sculpture on one front than the entire city then possessed. At the opening of the first Exhibition of the National Academy, Düsseldorf was a name unknown in the world of Art, and now it stands for a school of painting, to which we send our young artists to study; and their Düsseldorf Gallery in Broadway where examples of its masters are

exhibited to the public of the new world. All the great names in European art were then unknown: Delaroche, Conture, Ary Schaffer, the prè-Raphaelites and Maclise, had not been heard of.

But where are the great names that have gone forth from our Academy? Where is the American, or the New-York school of Art which has been nurtured by it? All the decorations of which we make so profuse a display, the painted windows of our churches, our frescoed walls, and the art embellishments which everywhere dazzle and bewilder us, are the work of Germans, Frenchmen, Englishmen, and Italian. Our young artists are sent abroad for instructions to Paris, Florence, Rome, and to the little town of Düsseldorf in Germany with not half the wealth nor population of one of the wards of our city. It is bewildering to look upon the splendid results of our free institutions and the indomitable energy and perseverance of our people. During the past 31 years, in which our progress in literature and science has not been less than our growth in population and wealth. Longfellow, Prescott, Bancroft, Willis, Lowell, Melville, Hawthorn, have all become famous since the National Academy was founded, and its first President has ceased to be known as an artist but has been immortallized as the inventor of the electric telegraph. After 31 years of drowsy existence, the National Academy has nothing better to offer us than a few pictures, but 288 of all kinds, and a good many of which are foreign, in a small apartment, once a small church, as the result of its influence on art.

There are many excellent artists and amiable gentlemen whose names are connected with the Academy; but it is very plain that, as an institution, it is most imperfectly organized, and of no considerable use to the cause of art. If it were shut up and forgotten, perhaps a better institution would take its place, and if the young artist and friends of American Art desire to see the metropolis of the New-World occupy the place to which it aspires in that regard, the National Academy should be promptly knocked in the head, and another organization, with better aims and better managers be put in its place.

Having thus taken a rapid glance at the Academy as an institution, let us proceed to examine the works it offers for public inspection. And first, let us attempt to instruct the public how to look at the pictures.

Enter the hall consecrated to Art, and respectfully salute the obliging porteress and ticket-taker, Mrs. Crocker; and, to prepare your eye for the artistic splendors in their gorgeous gilt frames, look first at the work which hangs directly over the door which leads into the larger hall; having satisfied yourself with gazing on this miracle of art, step across the threshold and look at the companion piece hung on the other side; and when your desire for something better has been sufficiently whetted in these unresisting imbecilities, you will be in a good conditions to appreciate almost anything, for almost anything will look lovely to you. But when you have selected the work you wish to examine, look at it long enough to become familiar with the artist's meaning, if he have any, and to free your eye and your mind from the dominant color and sentiment of the pictures which hang near it. This is all important, for looking at miscellaneous paintings is like drinking mixed liquors, the flavors become mixed and neutralize each other. Perhaps every one will remember some picture, which, in the studio of the artist, filled him with pleasure, but which appeared mean and poor when looked at in the Exhibition. In the studio it was seen by itself in its proper light, while in the Exhibition it was badly hung, and killed by its companions.

From the Jour. of the Phot. Soc.

PROCESS FOR KEEPING COLLODION PLATES.

To the Editor of the Photographic Journal.

Dear Sir,—I have lately adopted a mode of applying glycerine to collodion plates in order to make them keep, which is, I believe, new, and which, from its simplicity and (as far as I have tried it) certainty, will, I trust, prove of general utility.

I will first shortly detail the process, and then add some notes upon it.

1. To the ordinary collodion add glycerine in the proportion of six drops to the ounce.

2. Make a nitrate of silver bath in the usual manner, except that, instead of distilled water, a mixture of glycerine and distilled water, in the proportion of one oz. the former to five of the latter, is used.

3. Make a second bath, differing from 2. in this, that it contains only 6 grains of nitrate to the ounce.

4. Coat the plate with 1. and immerse it in 2. in the usual manner, after which immerse in 3. for a minute; drain it as usual, and you have a keeping plate, which I find to be as good at the end of a week as when fresh from the bath.

5. Before developing, moisten the plate with distilled water, then proceed as usual, taking care to add two drops of a 50-grains solution of nitrate of silver to the developing solution before pouring it on to the plate.

Note 1. For a short time I imagined (contrary to my expectation) that glycerine did not decompose a solution of nitrate of silver; I was, however, misled by the slowness of the action, for it does produce decomposition, although very slowly, even in the dark. This does not appear to damage the bath (it certainly does not for a month), but makes it necessary to filter it about once a week. In time the bath would probably become alkaline and require the addition of fresh nitrate and acetic acid.

Note 2. Six drops of glycerine to the ounce of collodion is perhaps a maximum dose. If too much is added, the film will have a honey-combed structure the quantity which can be added without producing this, will vary with the quantity of water present in the collodion; hence the collodion best fitted for this process is that made with anhydrous ether and alcohol, and it must be borne in mind that in actual use the proportion of glycerine will gradually increase, because the ether and alcohol evaporate, but the glycerine remains.

Note 3. If note 1. is supposed to contain an insuperable objection to this method, a horizontal bath can be used holding but little, and a new bath be mixed once a fortnight.

Note 4. The glycerine used must be pure, such as is prepared, by decomposing fats by high-pressure steam, by Price's Patent Candle Company, and which can be easily procured.

Note 5. My experience of this process is very short. I therefore have given proportions, not as being the best, but such as I have found succeed. More extended experience must show what is the minimum of glycerine which will produce the maximum keeping effect.

I remain, yours very truly.
Henry Pollock.

BINOCULAR PHOTOGRAPHY.

Sir,—I tried the double diaphragm experiment, as described by Mr. Norman, last summer, and also in the preceding year (Pho. Journal, ii. p. 230). I send you two positives, one taken with the two marginal holes, and the other with a small central hole of the same area as the aggregate of the two. Both were taken *cæteris paribus* in every other respect, and one after the other as rapidly as possible.

The double-image positive is far the better of the two, as you see. I did not expect any truly stereoscopic effect, but I think the images have a more full and round appearance. I also enclose the results of an experiment made this week on iridescent films. As I have *seen* nothing of the kind myself, I should be glad to know what you think of them. I will try the process once more and then explain it, if thought worth the trouble.

I am- Sir, yours faithfully,
R. Trevor Clarke.

[1. The picture of a bust appears over-exposed for a positive, and not enough for a negative. A bust taken with an ordinary lens has always appeared to us somewhat stereoscopic.

2. We shall be happy to receive further information on the subject of iridescent films, and their utility.—J. R. M.]

For the Photographic and Fine Art Journal.

NOTES
On the Production of Life-Size Photographs of any Dimensions.

BY A PRACTICAL PHOTOGRAPHER.

Fig. 1.—Ground Plan.

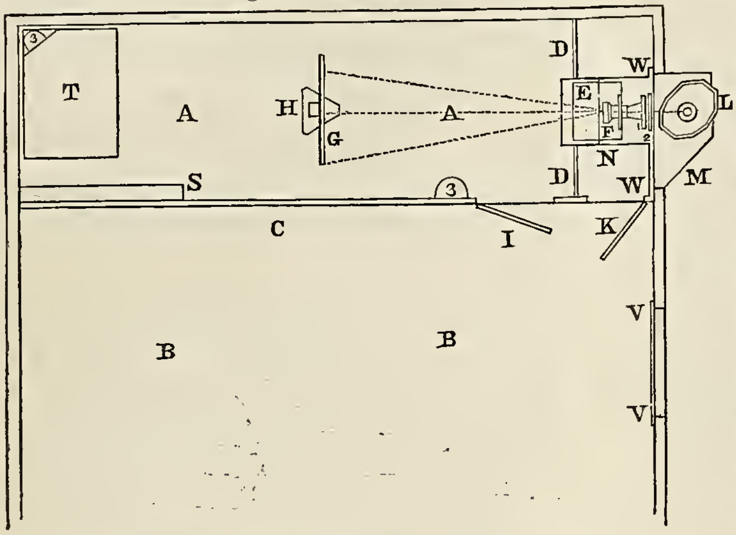
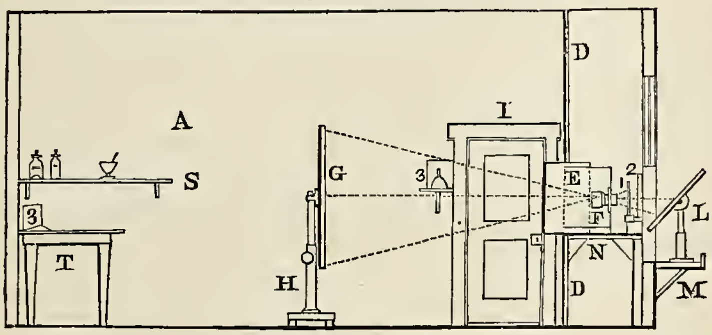


Fig. 2.—Section.



INTRODUCTION.

As introduction the writer would only remark that he is far from considering the arrangement of the operating-room, as well as the various formulas here given, as essential to success. They are merely given as a guide for the beginner, and at the same time as a help for those who wish for a sure and reliable basis on which to begin operations. The description of the operating room will be such as to include its applicability to the production of *any size* of enlarged picture; as the operating photographer will soon find that it is a bad policy to bind oneself in the arrangement of the dark room to the production of a particular size of picture.

CHAPTER I.

THE ARRANGEMENT OF THE OPERATING AND DARK ROOM, AND THE NECESSARY APPARATUS.

1. *The Operating-Room,*—Which is at the same time to contain the dark-room, ought (always in case the arrangements are to approach perfection) to be a large square room with its windows to the south. The first thing to be done is to partition off the window (W, W. see diagrams,) nearest to the wall, the entire depth of the room. This division (A, A,) ought to measure from the wall to the partition about six feet, and from the window to the opposite wall near twenty feet, or more. Next another division (D, D,) has to be made (inside the first) about 2½ feet from the window, and into this a square opening (24 inches each way) has to be cut, into which a double or sliding box (E) is fitted. This box rests on a shelf (N) fastened between the window and partition (D) and on which shelf (N) stands also the support for the negative picture (1) and the ground glass (2). Inside the sliding box the tube or camera (F) is fastened. Outside the window there is another support (M), upon which the reflector or looking-glass with its stand (L) is placed. I and K are two doors, the object of which will be explained in the sequel. G is the board (or tablet) for the sensitive paper, with its stand (H) which can be raised or lowered, and moved to any distance from the camera with facility. T is a table for exciting and developing; S a shelf for solution bottles and glasses, and 3 3, are yellow glass shades behind which to set the lamps. The operating-room (B B) has to be provided with conveniences for washing and fixing the pictures, and the windows with yellow curtains.

2. *The Reflector* (L) should be silvered glass, as the common looking-glasses are soon found to become perfectly dim and spoilt, probably from the heat of the sun acting on the amalgam. From 24 to 30 inches diameter will be found a sufficient size for a reflector, which is so fastened that it can be moved backwards and forwards, and inclined to *any* angle. Round or octagon will be found a more convenient form than square. Raising or lowering the reflector is not necessary, as its centre ought always to be on a line with the centre of the camera.

3. *The Camera.*—One ordinary double achromatic, full size camera tube will be found sufficient for enlarging almost any common size of negative to life-size and downwards. But the fastidious operator would soon find out that a great number of his enlarged pictures will be sadly deficient in sharpness at the margins, straightness of lines, clearness of tones, and equality of photogenic action on the surface of his paper. Now, to avoid this, tubes with lenses of different focal length, and of various dimensions, must be used, and the laws regulating the selection will be exactly the same as those by which the photographic landscape artist is guided for the choice of *his* lenses. The case is only a reversed one, in so far as in the present instance the tablet takes the place of the horizon, and the negative picture the place of the ground-glass in the camera-box.

I shall not enter into the details for the selection of lenses at present, as this subject is comprehensive enough for a separate chapter, which may be added at the conclusion of these notes.

(*To be Continued.*)

From the Jour. of the Phot. Soc.

GLASS DISHES.

To the Editor of the Photographic Journal:

Sir,—I beg leave to offer to Mr. Elliot a little improvement upon his method of constructing plate glass trays, and flatter myself that if he will make experiment he will not be displeased with the result. It is the plan adopted by engravers for retaining the acid upon the plates during the operation technically known as "biting;" and consists of a rim, or raised border of wax, attached to the plate in the manner I am about to describe. But first we will prepare the material: this is composed of bee's wax and white resin in nearly equal parts, but the wax preponderating—which must be melted over a very gentle fire, and the resin added gradually, in small pieces, and stirred until both are thoroughly combined, and all ebullition has subsided. The mixture is then poured on a smooth flat surface to cool, and when sufficiently firm to bear handling, placed in tepid water and well kneaded: the more it is twisted the more tenacious it becomes. Now with a camel-hair brush draw upon the glass a broad line of turpentine varnish, in the place where the embankment is intended, and while the varnish is drying place the wax in the water hot enough to make it quite flexible, but not to liquefy it; then roll a portion between the palms of the hands, in the

form of a long cylinder, pinch it into a flat band, and laying one edge upon the line of varnish, press it firmly on the glass with the thumb, at the same time with the forefinger turning up the other edge at a right angle; model a spout at one corner, and the dish is complete. The wax can be made to adhere by merely warming the glass, but the varnish gives greater security. When the full size of of the plate is required, the border can be applied at the back, and turned over the edge; a thin board, or stiff paper, should then be placed underneath to prevent the composition from sticking to the table in warm weather. And now Sir, having engrossed too much of your attention over this very simple process, I will trespass no farther than to subscribe myself.

Your respectful Servant,

J. Walsh.

From the Revue Photographique.

NEW KIND OF POSITIVES OBTAINED BY THE LIGHT OF AN ORDINARY LAMP.

BY M. NAVEZ.

We insert verbatim without alteration the following letter received from M. le Captaine Navez, dated Anvers, December 12, 1855. The thin glass enclosed in the letter reached us unfortunately in a dilapidated condition, so that we were unable fairly to appreciate the effect of this new sort of positive. M. Navez, however, merits our entire confidence and we willingly trust his statements " At this season of the year when the sun is in default, photographers will be pleased to received the communication of a process, enabling them to make use of the winter evenings for the drafting of very excellent *positives.*

" My process procures the following advantages: 1st. It furnishes proofs which in all probability are capable of indefinite-preservation, under the same conditions of intensity and tint, as at the very moment of drafting.

" 2nd. The proof possesses a delicacy of detail to which paper, even albumenized, is incapable of attaining. 3d The general tint of the proof is at the disposition of the operator, who may make use of tones of greater or less warmth, according to the subject in hand. 4th. A positive proof may be entirely finished in less than a quarter of an hour. 5th. After having employed the day for the drafting of negatives, the photographer may employ his evenings for the drafting of positives.

" The process is particularly applicable to portraits.

" Take a piece of plate or very smooth window glass and cover it with a very limpid coating of collodion, containing only iodide of potassium, and to which, when made, only the exact quantity of alcohol necessary to dissolve the gun cotton was added. Sensitise in a bath containing but little nitrate of silver (4 or 5 per cent.), and in which a little iodide of silver has been dissolved. Place your collodionized glass upon a black block surrounded with a ledge to support the glass. Apply the collodionized glass to the negative, the upper and lower extremities of which must be previously covered by strips of strong paper to prevent the contact of the wet collodion with the negative. Place the block vertically before a strong lamp furnished with a parabolical reflector, and surrounded, laterally, with a screen of black paste board, which prevents the diffused light from reaching the negative. The exposition varies from two to six minutes. Finish in the usual way with a saturated solution of pyrogallic acid and hyposulphite of soda.

" Dry the positive proof thus obtained perfectly. Lay it on a gilding stand and pour some well pulverized plaster mixed with gum arabic upon the collodion film. If in a hurry, dry with the lamp, taking care not to overheat.

" The proof thus obtained, seen on the side of the glass, appears in all its details on a dazzling white ground, if the glass used is of a very white material. The general tint of the proof may be varied by introducing appropriate colors into the plaster, according to the effect desired. These colors should only be used in minute quantities, and in using them reference must be had to the tint of the glass employed.

" In this letter you will find a specimen, sufficiently small and light to be sent by mail, accompanied with the description of the process, under the protection of a simple stamp. The German glass on which this proof is obtained, and which I have employed by reason of its slight thickness, gives a blue tint to the picture, injurious to the effect; a particle of carmine added to the plaster did not totally destroy the bad effect of the tint of the glass.

" My process dispenses with the employment of the passe-partout. The picture may be surrounded with gold lines made on the glass itself by the means used in the manufacture of passe-partouts.

" The positive proofs thus obtained, observing the precautions I have indicated, are much better suited than those on albumen for projections on the screen. They give models which we might in vain demand from albumen. We employ these proofs for the stump-drawing of portraits of the natural size. The draughtsman follows on the paper the projections of the photograph; in the left hand he holds a plate of ground glass, by means of which he may at any moment judge of the perfection of his work; the ground glass placed between the paper on which he is drawing and the projecting apparatus, hides the photograph, leaving the paper illuminated."—*Cosmos.*

[A process producing precisely the same effects, and much more simple in practise and perfect in detail, was discovered, over a year ago, by Mr. C. A. Seely, of New York.—Ed. P. & F. A. Jour.]

From the Jour. of the Phot. Soc.

COLORING COLLODION POSITIVES.

To the Editor of the Photographic Journal:

Sir,—I send for insertion in the Journal the following practical remarks, which may be of benefit to some of your readers.

I have, during the past year, paid particular attention to the methods of coloring collodion positives recommended by various authors, and I have tried most of the photographic colors advertised.

By following the directions given, I have never been able to produce a proper depth of color and smoothness of surface, the colors not adhering sufficiently to the plate; a second brushful causing the first to rub off when applied over it.

After repeated trials I find the following to be a very successful method, by which I can give any intensity and depth of color desired.

After the picture has been well washed and dried, I pour over its surface (in the same way as it is coated with collodion) a sufficient quantity of alcohol to cover it, returning in a few moments the superfluous fluid to the bottle.

I leave it till the spirit is evaporated and the surface dry. Then I breath evenly all over the plate, and when the whole of the visible dampness has dissappeared I commence coloring, going over a small portion at a time, using a circular motion of the hand. When all is colored, I use the elastic bottle to remove the superfluous color, and breathe on well a second time and if not sufficiently deep with the first colornig, go over it a second time in the same way as before. It may then be mounted, or before being done so, varnished with amber varnish, which will brighten up the picture, and make it very safe from damp and other atmospheric changes. I would very strongly advise those of your readers who have not succeeded by the ordinary methods of coloring to try this method, as I am sure, after a little practice, they will prefer it before all others.

In conclusion, I would say, that I shall be glad to supply any of the readers of your Journal with any further information they may require.

William Willis,

NOTES OF A TRIP TO EUROPE.—No. 4.

Philadelphia, April, 1856.

Friend Snelling,—The following day after my arrival in Paris was Sunday; in the morning the Parisians mostly attend church, the balance of the day is passed in pleasure-seeking, and if the day is fine the whole populace seem emptied into the streets. I wandered about, visiting many of the churches, most of which disappointed me, not being so fine in the interior as I had anticipated from their splendid exteriors, which I had so long been familiar with through the aid of that wonderful art, Photography! The Madelaine is the most gorgeous—it is really magnificent—rich in costly marbles and golden decorations, presenting more the appearance of a theatre than a temple for Divine worship. There is one thing that the visitor soon notices, the fine locations of the public buildings, or in other words, the unobstructed view that you have. No wonder that the French make such fine photographs; every object of interest is so easily got at. I found the markets all in full blast, Sunday though it was. Amongst the articles exposed for sale I noticed remarkably fine strawberries and apricots, which in the taste maintained the reputation of their appearance. I strolled about the city without any definite object in view further than that of sight-seeing. I passed the Louvre, with its long galleries stretching along the Siene. I passed down the quay, crossing and re-crossing the many bridges that span its shallow, muddy course; some of the bridges are remarkably fine in architecture. I stood for some time in front of the Hotel de Ville, viewing its numberless statues, a fine effect; the workmen were busy removing whole blocks of buildings so as to make the appearance more imposing. Thus I passed the day, wandering first in one direction and then in another. I remained in Paris until the following Thursday, but did not visit the Exhibition at this time, I was anxious to get into Italy, as the weather was getting so hot. I called on Mr. Thompson and introduced myself, which I felt at liberty to do, as he formerly sojourned here; he received me kindly, and did everything in his power to make my stay in Paris agreeable. He has a fine establishment and reaps the reward of his superior talents as a Photographist; he more particularly devotes himself to stereoscopic portraits, for which he has a great reputation. I also met Mr. Meade, of your city, to whom I am indebted for much attention. He introduced me at some of the establishments, among which that of Messrs. Miers & Pierson, which for costly decorations, surpass anything of the kind I ever saw—they must have spent thousands of dollars; soloous adorned with costly upholstery, gorgeous carpets, rich enough for a Turkish harem; furniture splendid in design and workmanship, while magnificent mirrors reflect back its beauty. Throughout the whole establishment is seen order and neatness, everything being conducted with a system; they have an immense patronage, and some of their colored photographs are beautiful; they were extremely kind, taking me through the entire place. To give you some idea of the amount of their business, I would state they employed at that time twenty-three colorists. I also visited several other large establishments; they all seem to devote most attention to photographs. I do not think that their untouched pictures are as clear and perfect as those made here, but there is one thing I noticed, they pay much more attention to the arrangement of the sitter, and disposition of the light, a point which is mostly lost sight of by the artists of this country, yet it is the most essential to a good production. I noticed very few glass pictures that could compare with those made in this country (perhaps they have not purchased the *right*, it is not so easy *Cutting* their eye teeth.) After visiting the photographers, I made a visit to the Louvre to see the paintings; but to give any description of this world of art would be a task far beyond my abilities; one must see them again and again, before he can speciate the beauty of any particular class, where there is so much. It is certainly a feast, one which I hope to enjoy again when I return to Paris. The evening before my departure I visited the Theatre Comique; it was decidedly Frenchy, and I was as much amused at the enthusiasm of the audience as at the performance.

On Thursday morning I drove down to the Marseilles depot, which is situated near the place where the Bastile once raised its gloomy walls; the spot is now beautified by the Column of Victory. It was 9 o'clock when I left the city, and a pleasant day; the road lay through a beautiful part of the country, passing Fontainebleu. At Montbain is the chateau of Buffon which is still standing, and in one part of the garden may be seen the ruins of a tower, in which it is said was his study. Soon after leaving this place you enter the Duchy of Burgundy, famous for its wines; the vineyards were in a thriving state of cultivation, and gave evidence of an abundant crop. We reached Lyons a short time before night, and as I had a couple of hours before the cars started, I amused myself wandering through this old and singular place. It is mostly built upon the side of the hills, and contains many strange old buildings. It has a population of over 200,000 inhabitants, whose chief employment is in the manufacture of silk, which has attained a world wide reputation. The place has always played an important part in the history of France, being the hot-bed of revolutionists. It was 9 o'clock in the evening when I left the place, so sight-seeing was over for a while, and I passed the time in sleep. When daylight again returned I found we were in a barren country, different to that which presented itself when I set out. At Arles I noticed some old ruins; that of an Amphitheatre was of vast proportions. As we neared the shores of the Mediteranian the country became very desolate looking, producing very little but olives and almonds. We reached Marseilles by 7 o'clock, A. M., having travelled 625 miles since 9 o'clock yesterday. I put up at the Hotel del Empereur, another fine place to spend money. The town presented a very lively appearance, being the port of embarkation for the Crimea; in all directions might be seen marching men on their way to embark, while the harbor was crowded with transports, among which might be seen the clean clipper craft of America, and here and there in strong contrast the heavy luggar of the Levant, while the quays presented a lively scene; the gay Frenchman, the picturesque Turk, and occasionally the brigand-looking inhabitant of the Appenines. I was obliged to remain here a day, as the steamer for Naples only ran three times a-week, so I amused myself watching the preparations of war.

F. De B. Richards.

From Notes & Queries.

METHOD

Of Lightening Waxed Paper Negatives that have been too much Developed.

La *Lumiere* of the 2nd of February contains a letter from M. de la Blanchère on this subject. He says: "It has, I think, frequently happened to every photographer using waxed paper, that the negative has become so much blackened in the gallic acid, that the picture is nearly, if not quite, obscured. This obscuration resists the action of hyposulphite of soda however consentrated; and after waxing, a print is obtained from such a negative, only after long exposure to the sun, and cannot be produced in the shade. These accidents occur when a print, immersed in the gallic acid, has been forgotten, or where the reducing action of the bath has been too great. I was induced to search for a method of restoring such negatives, and I have found an easy, and, as I think, novel one.

"Immerse in common water negatives, either new or old, and which have either been re-waxed or not; leave them some hours, so that they may be slightly impregnated with water, notwithstanding the wax then plunge them into a tolerably full bath of

Water	100 parts
Iodide of potassium	5 do.

The action is slow, but continuous. It requires sometimes as much as twenty-four hours, but it can be easily stopped at any moment.

Immerse the negative for a few minutes in the bath of hyposulphite of soda, wash and wax it.

"It is not easy to explain the action that takes place. This process has been in use for a year, and the action of potash upon photographs being known, I thought at first that the iodide that I had used contained an excess of that alkali, and that the lightening of the picture which took place, was due to its effect. I have repeated the experiment with specimens of Iodide of potassium obtained from different sources, and not having too alkaline a reaction, and they have all given the same result. One may, I think, attribute it to the decomposition of the iodide of potassium by contact with the air, the iodine slowly volatillising, and the potash set free acting on the photograph, and producing the effect observed.

"I leave it to those experimenters who have the time to try a bath of potash, which will perhaps produce the same result, if sufficiently diluted.

"It is equally easy to lighten negatives that have been strengthened by terchloride of gold, and which in that bath have become completely obliterated by a blueish-black covering."

M. DE LA BLANCHEER

PHOTOGRAPHY ON COLLODION.

BY D. VAN MONKHOVEN.

Translated from the French for the Photographic and Fine Art Journal, by W. GRIGG, A. B.

Our design in publishing this small treatise is not to furnish our readers with entirely new processes, but to develope, in a more ample manner than has hitherto been done, the theoretical considerations to be observed in the composition of the various liquids more directly connected with photography on collodion. We are convinced that if the methods we submit be studied with any attention, all failures will be prevented, and our readers will consider that they have acquired this capricious yet beautiful process in such a manner as to produce invariable results.

Having a knowledge of the formulas we employ, it is easy for us to forsee the results to be obtained. The following general ideas on the *tout ensemble* of heliographic operations will explain this.

An alkaline ioduret is dissolved in collodion to which sufficient fluidity has been given to produce a smooth even film upon a piece of glass, previously freed from all foreign substances. This plate being immersed in a solution of nitrate of silver,* the alkaline iodide will necessarily pass to the iodide of silver state. Now let us expose for several seconds this sensitized glass to the action of the light in a camera, and then transfer it to a reducing bath, composed, for instance, of pyrogallic acid. By an action, thus far unexplained, the light will have endowed the iodide of silver with the property of precipitation into the metallic state, and *the reduced silver of the nitrate moreover acting on the changed iodide* will bring forth the picture. With a dissolvent we then remove the unchanged iodide of silver. Hence it results decisively that the photographic picture is formed by a powder of silver in a state of the finest division, maintained in a uniform film by the pyroxyline. Now if the white parts in the original are of an opaque black in the proofs, the picture is denominated a negative, if, on the other hand, these parts are but slightly marked, we style it a positive (this however, when viewed by reflection). As the picture is formed by reduced silver, producing a film depending for its thickness on the quantity of iodide and pyroxyline contained in the collodion, the greater or less concentration of the nitrate of silver, and the duration of the exposition to the light, it follows that the pyrogallic acid finding matter to work upon for the reduction of a large amount of silver, will furnish a vigorous proof, which will consequently be a negative.

But by diminishing the dose of iodide the sensitive film will be of less thickness, and however long the exposition to light, the reducing agent will never produce a negative, as it does not find sufficient silver to precipitate for the production of a vigorous picture. It follows therefore that we obtain a positive.

The reader may already perceive that there is great harmony existing between the productions of luminous action and the quantity of water with which the reducing agent is supplied by the collodion and silver bath.

Some persons have never been able to obtain direct negatives, which may be generally attributable to the fact that their silver bath was never sufficiently concentrated. With a weak sensitive bath it is unnecessary to employ a highly iodized collodion, and then increase the time of exposition; by this method we could never attain any satisfactory result. So also, if we have baths designed for the production of negatives, we need never hope to obtain positive pictures; by lessening the luminous action, we will never bring out the details in the white parts; and even though we should, by considerably diminishing the duration of the pose, be enabled to surmount this latter difficulty, the darker portions of the original, would be in no wise developed. To obtain negatives, therefore, it is necessary as a general rule to employ a thick and highly iodized collodion, a concentrated bath of silver, a proportionably long exposition to the light, and lastly, a powerful reducing agent. For positives, on the contrary, we must diminish the dose of iodide, nitrate of silver and pyrogallic acid, and thus by presenting but a weak film for reduction, render the luminous action of shorter duration.

But there is a question important in another way, in that it exercises a direct influence on that portion of photography relating to the exact proportion of bromine to be employed, and as regards that of iodine, for the purpose of obtaining a uniform impression of the colors. We have studied this question carefully, and shall give the results of our experiments in a subsequent chapter on iodized collodion.

We have devoted a chapter to the drafting of positives on paper, we hope it will meet with a favorable reception by many of our readers.

We shall sometimes enter into chemical considerations which we shall be unable fully to develope, owing to the narrow limits to which we have confined ourselves, we shall also take it for granted, that the various preparations connected with photography, such as the rectification of ether and alcohol, the reduction of chloride of silver etc.,* are well known and understood. This work is specially written for those having some experience in the collodion process. We shall describe the principle manipulations at sufficient length however to enable those totally unacquainted with photography to get at the necessary details. We advise our readers not to allow themselves to be discouraged by failure, the slightest cause is often sufficient to occasion negative results. It is only when we have gradually become familiarized with those obstacles that we can attain as a perfect knowledge of the process.

CHAPTER I.

SIMPLE COLLODION.

The first application of gun cotton in photography, was made by M. Legray, in 1851, it is but just however to say that to England we owe the full development of this process.

Collodion is a solution of pyroxyline in ether, alcohol being added.

The name *simple collodion* is applied to it in photography when it contains no sensitizing iodide, when iodized on the other hand, it is denominated *collodion.*

Of all the substances thus far employed as photographic vehicles, collodion is the most sensitive: this is owing to the fact that it allows itself to become easily impregnated with the liquids, and that its delicate and porous nature is of marvellous service to the luminous action.

Before entering more widely into any considerations on collodion, let us first look at its mode of preparation. Three ele-

* We deem it useless to observe that this operation takes place in a dark room.

* We refer those of our readers who are not familiar with chemistry, to the excellent work of Messrs BARESWILL & DAVANNE, "*Photographic Chemistry,*" they will there find every desirable information.

ments enter into its composition; gun-cotton, ether and alcohol.

Of the gun-cotton.—Gun-cotton is a highly combustible substance. It was once thought that it might advantageously take the place of common powder, but the dangers which accompany its preparation, its high price and its shattering action in fire-arms, have caused it to be rejected. It has since been put to important applications in medicine and photography.

There are two principle methods for the preparation of pyroxyline: the first (by Mr. Meynier) consists in steeping perfectly white and pure carded cotton in a liquid composed of equal weights of concentrated sulphuric acid and monohydrated nitric acid. On removal from this mixture, the cotton is pressed between two plates of glass, to rid it of the excess of acid. It is, then very carefully washed in a number of waters and dried at a temperature of 100°. Gun-cotton prepared in this manner, is but slightly soluble in alcoholized ether, and consequently cannot be employed in photography. In return, it burns very briskly, disseminating a decided odour of nitric acid.

Water charged with potash or soda, dissolves gun-cotton An alcoholic solution of these bases poured into collodion, separates the pyroxyline, on adding a few drops of water the precipitate agglomerates and leaves supernatant ether and alcohol. Here then, when our collodion has become unfit for use, we have a very simple method whereby we may turn it to account.

M. A. Gaudin has given another method for the preparation of gun-cotton which is perfectly soluble in alcoholized ether, with but slight combustible properties; all its other properties, moreover, are similar to those of fulminating cotton.

As this is the method which must be adopted in photography, we give it with all its details.

Pour into a glass tumbler, 90 grammes of perfectly colorless concentrated sulphuric acid, introduce in small portions at a time 60 grammes of fine powdered acetate of potash, (refined saltpeter.) As soon as an homogenous mixture has formed, sink completely under the surface of the liquid, three grammes of the purest and whitest carded cotton. (If there be reason to suppose that it contains any soluble impurities, it will be well to first wash it with distilled water, but it must then be dried with the greatest care.) The acid must thoroughly penetrate the fibres of the cotton, which is accomplished by pressing the latter in the liquid with a glass rod. Cover the glass with a plate so as to avoid breathing the nitrous vapours which are continually being freed. Let the cotton digest for at least 10 minutes, it will be better to give it a longer time, as it will then as a general rule give a pyroxyline which dissolves with greater facility. The cotton forms with the saltpetre and sulphuric acid a stiff intimate mixture; on removal from the glass, it should be put into a large vessel of water and shaken up to dissolve the adhering salt. Sometimes this saltpetre, or rather sulphate of potash sticks so persistently among the fibres of the cotton that we have often noticed it after an immersion of 10 hours in *cold* water. On removal from the acid, we think it advisable also to throw the cotton into boiling water, shaking it up constantly. In this case the cotton becomes supple in about five minutes. Having reached this state, expose it to a jet of water, and press the liquid out; this should be done several times, until perfectly clean. This operation should be pushed to the extreme, as it is often of the highest importance that the acid and especially the sulphate be removed. The cotton is lastly immersed in *boiling distilled water*. To know whether the cotton has been sufficiently washed, the following method may be made use of. Pour into a clean vessel, the water of the last wash. Dip first in it a piece of turnsol paper, which by its change of color denotes the slightest trace of acid, changing from a blue to a red, then pour in a solution of acetate of baryta; if the liquid becomes muddy if only in the slightest degree, it denotes the presence of sulphate of potash. In both cases the washing must be continued Then press the water out and opening the flakes allow them to dry in the open air, and then expose to a temperature of 100°. The best method to prevent the dust, and one which at the same time dispenses with the necessity of raising the temperature, is to enclose the cotton in a tight wooden box containing a few peices of very dry chloride of calcium in a china saucer. Dust quickly gets into moist gun-cotton, and the consequence is a muddy collodion. This is the origin of the spots sometimes shown by proofs during the immersion in the bath of iron. If very light floating bodies, generally particles of dust, are perceived in the collodion when examined by transparence, this collodion will undoubtedly give birth to stains in the reducing bath.

The higher the temperature of the acid mixture, the more soluble is the gun-cotton, it should not however exceed 100°. To obtain a good pyroxyline, it is also indispensable to immerse the cotton in the liquid as soon as the saltpetre has formed with the sulphuric acid a clean pulp, and as the more rapid the disengagement of heat, the more lively the reaction, it follows that the saltpetre should be reduced to a state of fine powder.

It is better to introduce the cotton by degrees into the acid, for if it be all immersed at once, it would decompose the liquid, retaining it among its fibres; rutilant vapours would then make their appearance, giving the acid a deep red color. If the operation be continued, the result would be an imperfect cotton.

Neither is it necessary to make large quantities of the pyroxyline at once. Three grammes are sufficient for one experiment; several preparations however, may be made in different glasses, and all may be washed at the same time.

That commerce may furnish us with a gun-cotton completely soluble, leaving no deposit and possessing a gelatinous consistency is a consummation devoutly to be wished. For those who do not make a daily use of collodion, we recommend the following: it possesses the grand advantage of always presenting the same solubility. Dissolve 50 grammes of gun-cotton, in about a quart of water, to which add 200 grammes of alcohol. Shake the mixture well and allow it 8 days to subside. If it be perceived that the solution is too thick to permit the fine undissolved fibres to deposit, add a certain quantity of alcoholized ether, to increase the fluidity. When the liquid has become transparent, and all the impurities have perfectly subsided, decant the clear collodion into a retort, and distill at 36° temperature, taking care to work very slowly and to collect the proceeds. When reduced to one tenth its volume, break the top of the retort and allow it to evaporate in the open air. When the cotton is thus perfectly dry, it is ready for use. In this state it is as transparent as gelatine. It should possess a certain elasticity and be free from all odour.

This pyroxyline would be of a very high price, but we repeat, many amateurs would prefer it to any other on account of the facility with which it may be employed. For daily work it is evident that the process would be in no wise economical.

Alcohol.—The first quality alcohol must be used in the composition of collodion. In winter it should indicate 98°, and in summer from 92 to 95. It may moreover be purified by distillation over quick lime. Alcohol must be exempt especially from all foreign odours which are in the highest degree detrimental to its quality, they generally betray the presence of essential oils, which sometimes destroy the sensitiveness of the collodion. An odour of varnish especially should cause its rejection as it is often the cause of the collodion cracking in longitudinal fissures on drying the proof, diminishing besides its sensitiveness.

Ether.—It is very difficult to get pure ether. Ether furnished by commerce most often possesses an acid reaction, and contains water and alcohol. To purify it, throw in a few fragments of chloride of calcium and a little slack lime, and let it stand several days. Two distinct strata are then formed; pour off the upper portion into a retort and distill with the water bath. By this means we obtain ether indicating 58° *ether scale* areometer; a second operation produces complete rectification, and the ether then shows from 62 to 66°. We cannot then call it perfectly pure, but sufficiently so for the purposes of photography.

If ether be highly rectified, it will cause a partial precipitation of the gun-cotton, from its thick solution. If therefore we pour a stiff collodion containing a very little alcohol into pure ether, the pyroxyline will precipitate in the form of a white jelly, but on adding a few hundredths of alcohol, the liquid will reassume its limpidity.

The water in the alcohol and ether is the most common cause of the fissures which sometimes show themselves after the collo-

dion film is dry. The film is never, moreover in this case, as firm. This may be proved by adding water to the collodion, the resulting proof will adhere but slightly to the glass. We will now see by the following experiment made on this subject, what are the proportions of ether and alcohol we are to employ to obtain a good collodion.

1st. If the ether predominate in an excessive proportion, the collodion, whatever be its state of fluidity, will spread badly, by reason of a too rapid evaporation, but the sensitive film possesses great tenacity, and is not separated from the glass by the force of a strong current of air. Such a collodion will generally furnish very rapid and exceedingly beautiful positives.

2nd. Alcohol on the other hand causes the collodion to spread more evenly, but the film may be detached by the action of an any way rapid jet of water. The pictures generally possess extreme delicacy.

3rd. The preceding data are proportional to the temperature in this way—that it is necessary in summer to diminish the dose of ether one fifth, on account of too rapid evaporation, and to increase it in the like quantity in winter.

We employ the following proportions:

Ether (at 64° ether scale)......	centilitres cubic	800.
Alcohol (at 90° alcohol scale).........	do	100.
Pyroxyline.....................	grammes	30

If the pyroxyline should not be entirely soluble, it would be necessary to augment the quantity so as to have approximatively 30 grammes in solution.

These substances must be kept in a flask having a ground stopper, and well shaken to produce an intimate mixture. It should be given several days to subside.

We shall designate this collodion as *thick collodion No.* 1, (1 gram. cotton to 30 centilitres cubic of collodion). *Normal collodion No.* 2, is thus composed.

In winter, temperature being from 4 to+14°.

Ether (anhydrous)................	80	centil. cubic.
Alcohol (99°)	70	do
Thick collodion No. 1..............	90	do
	240	centil. cubic.

That is 1 gramme of pyroxyline to 80 centilitres cubic of collodion. *Proportion of ether to alcohol* 6 *to* 3.

Mean temperature from 4 to 16°

Ether (60 to 64°)................	70	centil. cubic.
Alcohol (94 to 98°................	80	do
Thick collodion No. 1..............	90	do
	240	centil. cubic.

That is 1 gramme of gun-cotton to 80 centilitres cubic of collodion. *Proportion of ether to alcohol*, 5 *to* 3.

In summer, great heats of 16 to 32°.

Ether (58°)......................	60	centil. cubic.
Alcohol (90°).....................	90	do
Thick collodion No. 1..............	90	do
	240	

That is 1 gramme of pyroxyline, to 80 centilities cubic of collodion. *Proportion of ether to alcohol* 4 *to* 3.

In the preceding formulas it may be perceived that in these proportions there exists a certain harmony. Whatever the temperature, the unity is always the gramme of gun-cotton to 80 centilitres cubic of liquid. As this collodion is rather thick, it may be liquified, if any difficulty be experienced in spreading it, by the addition of alcoholized ether, the proportions however of alcohol and ether we have given for the different temperatures must be strictly observed.

We have observed, as the experiments moreover of numerous English photographers also prove, that the proportion of alcohol generally employed is too trifling; the chemical action is better accomplished when the alcohol is more abundant; but this difference arises also from the fact that an article containing a tenth of alcohol and a thirtieth of water is sold in France, under the name of rectified ether, which of necessity changes the formula. English operators rectify their ether (62 to 66°) themselves, and are therefore more sure of their process. The collodion of which we have just given the formula spreads admirably on the glass, and, by not drying too rapidly, enables us to obtain a perfectly even film, added to which the proofs possess singular delicacy.

Mr. Fry, a very eminent English amateur, recommends that a few fragments of leaf gutta percha be allowed to dissolve in the collodion. It is stated that this collodion, after the proof has dried, gives a film as firm as albumen; we have employed it, but met with no such result. Not having entered however into any comparative experiments, we can make no certain decision.

An amendment important in another light, the truth of which we have already proved, was made by M. Tifferean in La Lumicre of the 21st of Oct. 1854.

"Iodized collodion exposed to the direct action of the sun for three or four days, acquires such an extraordinary sensitiveness that I have been able to take instanteneous views in rainy weather. Unfortunately, however, it does not long retain this property; its sensitiveness gradually diminishes, and continues to change even when entirely withdrawn from the action of light. The proofs gradually grow clearer and clearer, until at last they become completely clouded; the whites pass to a grey, even by employing protosulphate of iron, and we cannot obtain a good negative with pyrogallic acid. Unsensitized collodion exposed to the sun, acquires after sensitizing, the same properties with the same disadvantages.

"I have obtained with these collodions, before they changed, postives which rivalled any proof on metal for model and delicacy of detail, with the disadvantage of reflection. Thick collodion which does not spread easily over the glass, acquires great fluidity on exposure to the sun, but loses it as rapidly.

"Lastly I advise all photographers to protect their collodion from the action of light, by covering the flask with black paper; this, I think, will tend to prevent all chance of failure inherent to this art, produced in part by diffused light acting on the collodion."

To this we will ourselves add, that ether, alcohol, and every liquid entering into the composition of collodion should be kept in ground stoppered flasks; cork contains highly injurious essential oils.

Many amateurs, ourselves among the number, prepare in the winter, the substances which they need during the summer. We also, for our own use, rectify a large quantity of ether and alcohol during the bad season, and prepare a series of flasks of collodion, which we always have ready at hand. In this case we recommend that the flasks be filled to the brim, lest owing to the presence of air, the collodions become acid (acetic).

Before corking, heat the collodion to 30° to prevent the flasks from cracking by the expansion of the liquid on a sudden rise of temperature. The flasks, vessels etc., which are to receive the collodion, should be cleaned with the greatest care; they must be first washed with a little nitric acid, and then in several waters. Then rinse with alcohol and lastly with ether. In this way they may be made perfectly clean. When the proof is dry, the film of collodion sometimes cracks in a very vexatious manner and presents the appearance of a sort of open net-work, involving the entire picture, and destroying its delicacy. This is a defect noticed by every operator, but few however have endeavoured to discover the cause, or its mode of remedy.

About the end of last November, after a considerable depression of temperature, this action reached such a point that it became impossible to obtain a single good proof, especially with sulphate of iron. We changed our baths several times, but still the defect was visible. We prepared various pyroxylines, still the net-work was apparent. It could not therefore be attributed to the bad quality of the cotton. An idea struck us that it might arise from the water of the collodion which combining in slender strings during the evaporation of the collodion, might cause on drying of the film these irreparable defects. We then prepared a fresh collodion composed of ether and anhydrous alcohol, and obtained a film of exceeding delicacy, and whose adherence to the plate, when dry, was perfect. The following is a review of our observations on this point.

1st. In summer the temperature being elevated, the collodion may contain much more water than in winter, without the proof cracking after drying.

2nd. In winter at 8° below zero, collodion should be strictly anhydrous, otherwise a portion of the proof will be always riddled with holes.

3rd. From zero to 10°, collodion may contain from 1 to 4 hundredths of water; from 10 to 30° it does not crack more than though it accidentally contained a large excess.

4th. As remedies we advise:

To add pyroxyline to the collodion in such a degree as to obtain a very thick film. To dehydrate the sensitive or non sensitive collodion by adding one per cent. of its weight of fluoride of potassium, to shake well and allow it several days to subside. The water is precipitated by the fluoride, and forms with the latter a heavy liquid which remains in the bottom of the flask. If the formula of the sensitized collodion does not permit the presence of fluoride of potassium, rectify the ether and alcohol separately, so as to obtain ether at 66°, and alcohol at 99°. Collodion composed of these substances thus purified, will not crack.

Mr. Maurice Lespiault advises in La Lumiere of the 29th July, 1854, that an alcoholic solution of ceroleine be added to the collodion; he states that there will be no loss of sensitiveness by this method which will effectually parry the disadvantage on account of the great elasticity of the ceroleine. Other substances have also been added for different purposes. Acetic acid gives greater delicacy, but retards the luminous action. M. de Brebisson, however, makes use of it in his instantaneous collodion, but only for positives. In fact, as acetic acid does not allow the black parts of the design to become sufficiently developed, it is natural to attribute *partially* to this effect, the difficulty with which we obtain vigorous negatives with aceto-iodide of iron collodion. In every case, the acetic acid liberates the iodine of the alkaline iodide used to sensitize the collodion, and consequently nitric acid is formed in the silver bath, causing a great loss of sensitiveness.

Mr. Shadbolt adds to simple or iodized collodion 1·2 grammes of chloroform, to 100 grammes of collodion, and he finds that the impressed film is so fine that the details in the proof are invisible with the microscope. (Journal of the Phot. Soc. Vol. 1 p. 194.) We finish this chapter with the recommendation to amateurs to observe the strictest care in the preparation of simple collodion. It is impossible to obtain good results, if this primary condition be not fulfilled. We have a simple method whereby we may assure ourselves whether our collodion will satisfy every requirement.

Pour some upon a piece of glass and examine. It must possess the following qualities.

1st. When dry, the film must be perfectly transparent. If it be of an opal tint, the cotton used in the preparation of the pyroxyline was imperfect. 2nd. Viewing the film by reflection, its surface should be as even as the glass itself and without wrinkles, which would indicate that the collodion was too thick. 3rd. The film must not peel off on endeavoring to detach it; this would be an indication that it would be liable to crack on a sudden depression of temperature. It must on the contrary possess a certain elasticity. 4th. And lastly the film must adhere well to the glass, and be able to resist a gentle rubbing. Collodion possessing these various qualities will always furnish excellent results.

(To be continued.)

Nitric Acid.—This acid is composed of 1 part nitrogen and 5 of oxygen. It may be obtained by distilling salpetre or nitrate of potash with oil of vitriol. It is found abundantly in commerce; it is used in photography to form the nitrate of silver, and the chloride of gold, by its union with hydro-chloric acid. It may also be employed to blacken positive proofs, by adding it to the hyposulphite of soda solution. In a diluted state it is employed with rottenstone to clean the daguerreotype plate; ten drops to the ounce of water being sufficient.

THE PHOTOGRAPHIC GALLERIES OF AMERICA.

NUMBER TWO—PHILADELPHIA.

Philadelphia, April, 1856.

Mr. Editor,—In pursuance of promise I send you No. 2 of my series of letters on the Photographic Galleries of America. Philadelphia, the clean, the regular, the slow, the sure, the even placid city of Philadelphia! its very atmosphere breathing *amor fraternus*, and as its name indicates, receiving every stranger with open arms, will (as it justly should, being the second city of the Union) be the scene of my second letter. The streets which have been selected by the Philadelphia artists for their places of business, are Chestnut, Market, Arch, and Second streets; the latter street boasting of the greater number, though not the greater talent. It is a business street, near the Delaware, with stores of all kinds, from a junk shop up to a wholesale grocery; it also contains a market, and is so noisy and so narrow, that it would seem badly suited for photographic purposes. Although some of the galleries in this street are superior, it is, however, evident, that this is not the resort of upper-tendom. The finest talent is in Arch street, from the Delaware to Eighth. There are but few artists, however, in this street, but those that are here are good; here we find the gallery of Rehn. Market street is in fact the market of the city. It is a very wide street, the market, however, running through the centre, with large wholesale stores on each side; it is the great business street of the city. Here quite a number of Photographers have congregated. Chestnut street boasts few, but those few are among the first in talent.

The atmosphere of the city is highly suited for the production of clear pictures, and there is a noticable fact going to prove this statement, that in otherwise very poor pictures, the eye was generally clear and sharp, rendering that peculiar refraction of light on the iris which speaks of the soul within. I consider this to be chiefly owing to the clearness of the atmosphere, as, were it to be accounted for in any other way, we could not explain its universality. I do not think it would be either unwise or unfair to make a comparative estimate of the progress of the different states of the union in the Art of photography, and in this relation, I would say with all due respect, that I consider the artists of Philadelphia, as far behind their brethren of New York, not only in the elegance of their galleries, but in everything showing a determination to push the art forward; but at the same time I report that in Philadelphia we find unexcelled artists.

I have seen pictures both in New York and Philadelphia, that might well have been the productious of a grocer's clerk, or tin-man's apprentice; and lo! they were taken by a man styling himself a dayguerrean artist. Is it imagined that the art of photography presents nothing which requires an hours study? Go thy way, fool, and earn thy daily bread, but remember that thou art cheating thy neighbour none the less, than he who by a little study and perseverance could give a good article forces, on his ignorant friend a worthless imitation. If such a person considered honesty as the best policy, he would refer his friend to those who for the same price would be glad to furnish the genuine article.

I understand, Mr. Editor, that you are about publishing Monkhoven Photography. Having read this work, I would recommend it to every artist in the land, as being the best thing ever written of the Art, and will warrant that all who may read it, if they give sufficient attention to its explanations, will be enabled to produce the most exquisite pictures.

To return to my subject, I think it advisable to give the names of the Philadelphia artists in the order and with the remarks I made upon each, during my visit to their galleries.

And first in order I shall place,

Rehn of Arch St.—Well do his superior pictures deserve the place. This gallery is the most frequented in the city, especially by the more wealthy classes. The gallery however is not large nor elegant, but neat and orderly, and when we look at the contents we forget the case. The ambrotypes are in the first style, such as we might only expect from one who not only invented

but improved. Many of the ambrotypes are deserving of especial mention.

An ambrotype portrait of ANDREW JACKSON DAVIS the seer, is as near perfection without attaining it, as anything we have yet seen; another of LUCRETIA MOTT, the Quaker preacher of Philadelphia, is excellently rendered and deserves to be hung, as it is, in a conspicuous place: another of Mr. DREW, the actor, equally excellent. His mezzographs in oil are really something superior. One of HENRY CLAY, retouched, is equal to the finest steel engraving, and has also that appearance. I noticed some copies of pictures woven in silk in Paris, which present a very peculiar appearance, a portrait, ambrotype, of a sister of RACHEL and one of Miss LOGAN the actress, are tip top productions.

M. A. ROOT & Co., Chestnut St.—This gallery contains pictures which undoubtedly mark these gentlemen as superior artists. Their ambrotypes are really beautiful, but I did not like them as well as their paper photographs and daguerreotypes. This gallery contains the best daguerreotype of FOREST I have ever seen. There were also several general portraits, among which is one of an Italian gentleman, which are really exquisite productions. Every gallery should contain some particular specimen which will admit of description by name. If we must speak of them indefinitely as the portrait of a lady, the portrait of a gentleman or the portrait of a child, we may as well speak of the gallery in a general way.

MCCLEES, Chestnut St.—We cannot speak too highly of this gallery. It is well arranged and fitted up, and contains a splendid array of pictures. Among them I noticed some very fine India ink and Crayon photographs; the ambrotypes also show excellent skill. The collection embraces some very superior positive photographs, one of a female especially, enveloped in a cloud, resting as it were on the bosom of the air. The gallery is light, and shows the pictures to advantage. It is an excellent studio.

FREDERICKS, PENABERT & GERMON, Chestnut St.—The distinguishing feature of this gallery is its oil colored photographs, which are only equalled by some I have seen in BRADY'S gallery New York. The positive photographs show much artistic skill, and are notable for great depth of tone, softness of contour, and for even balance of light and shade. The rooms are very prettily furnished, and their appearance very effective.

RICHARDSON.—One of Philadelphia's best artists, and one of whom she may justly feel proud. Everything bears the impress of the master's hand. The ambrotypes will rank with the first. One of a female, taken on a white ground, possesses a really fine stereoscopic effect. The photographs, touched and untouched, *arrest* the visitor, this is saying much, as one, as a general thing in photographic galleries is apt to pass rapidly around from picture to picture, until he at last again reaches the door where he makes his exit. It is only in such galleries as these that one finds any pleasure in lingering.

VAN LOAN, Arch St.—One of the A No. ones I could not speak too highly of this gallery. It is really pleasant to the eye to behold such clearness, such cleanliness, and depth of tone, such real artistic pictures. The photographs much resemble those of Rehn, and are surpassingly fine. All the pictures bear critical examination, and especially the photographs on paper. This gentleman is evidently labouring for the advancement of the art as well as temporary livelihood. I noticed here, some of the best photographic copies of oil paintings I have ever seen.

SHAW, Arch St.—Is another excellent artist. His gallery contains many excellent specimens deserving general praise, I cannot however designate any by name, being mostly portraits. The ambrotypes are not in the first style, not possessing that depth necessary to give effect to pictures on glass. The photographs however are decidedly superior.

ENNIS, Arch St.—Some very good specimens of daguerreotyping. Noticed no ambrotypes or photographs. The gallery small.

ISING, Arch St.—Some pretty fair photographs and dagurreotypes. The great defect is want of softness in the photographs especially, the daguerreotypes are better in this respect, but are wanting in sharpness.

DAWSON, Chestnut St.—Mediocre artist. I noticed nothing but daguerreotypes, there were a few which were respectable but dimness and want of cleanness of the glasses destroyed their effect.

RICHARD, Chestnut St.—What can I say for Richard? I must place him with REHN and VAN LOAN, making the three par excellence photographers of the city. His stereoscopic pictures are in the highest degree beautiful. I think, in fact, that his gallery is the best arranged in the city, and presents the finest appearance. His ambrotypes are worthy of long examination, and his positive photographs I can only compare with those of GURNEY of New York. The oil colored photographs are excellent. RICHARDS is a man of artistic sentiment, and it would be indeed strange if he were second to any in the art he has espoused. I have seen, Mr. Editor, many an excellent *morceau* in your Journal, from the pen of this gentleman, which would have led me to expect the results which were verified by my visit to his gallery. On leaving this studio, as also those of REHN, VAN LOAN, MCCLEES, and others, I felt as though it was my duty to thank Providence for giving us artists who were not only willing but able and determined to feast the human eye with the best production of art,

BROADBENT & Co., Chestnut St.—What specimens we saw, chiefly daguerreotypes, were in the first style of the art, with a few exceptions. Good daguerreotypes are not so much appreciated as formerly, as the attention of true artists is directed now particularly to Photography on paper and glass. As daguerreotyping has not yet reached its acme of perfection, I am very glad to see that there are some artists who are still striving for its improvement; although I acknowledge the superiority of paper and collodion photographs.

SERGROVE, Chestnut St.—I am sorry that I cannot speak in the highest terms of this gallery, as I think some of the pictures show care and skill. But speaking generally, I noticed great want of improvement in everything relating to the art. I should advise those who are desirous of commencing the practice of the Photographic Art, to take up ambrotyping, as people of the present day, have become more fastidious and better acquainted with daguerreotyping, and will only purchase pictures in the first style of this branch of the art.

COLLINS, Chestnut St.—Daguerreotypes, nothing worthy of notice. The specimens are mostly muddy and dim, and show great want of care and taste.

RILEY, Market St.—Daguerreotypes in the 3rd or 4th style of the art, noticed no ambrotypes or photographs.

KEELER, Market St.—Some very excellent specimens of daguerreotyping, the photographs however are coarse and unpleasant to the eye. A little theoretical knowledge (to be derived from *Books*) would set this artist right.

STECK, Market St.—Daguerreotype artist. Nothing (owing to the lack of all care in manipulation) worthy of remark. Remember for these defects, there is no excuse.

MAHAN & GOOD.—Pretty fair pictures, some excellent oil colored deguerreotypes. The pictures however are no wise remarkable for beauty.

RAN & SON, Market Street. If it were not for the uncleanliness of the specimens, we should vote the gallery a very good one. Nothing on hand but daguerreotypes.

PHILLIPS, Market Street. Excellent pictures. The eyes very sharp, and the whole picture clean and well defined; some superior, camparatively speaking.

MISS MAHAN, Market Street. Twenty-five cent daguerreotypes. We grant the lady every compliment of the art, and hope she will be able to raise her prices.

GLEDHILL, Market Street. "Solargraphic and imperishable Ambrotypes, by judges pronounced to be perfection." I pronounce them simply Ambrotypes, in the common acceptation of tho term; but how far they may be *Ambrotos* or indestructable, or, as he has it, imperishable, I do not know, but leave it to the decision of future years. I also pronounce them very good, sharp and clean, but not *perfection*.

EVANS, Market St.—A good, substantial little gallery. The pictures are deserving of credit. In photography we can easily

distinguish the clean, careful artist, and are always disposed in his case to overlook lesser defects.

W. Taylor, Market St.—These daguerreotype specimens are pretty fair. There is, however, a great want of sharpness. In these pictures especially, I noticed that the focus was set on some prominent part of the sitter, to the exclusion of the rest of the body; now, every one will admit, that a mean distance should be taken if we wish to bring each part into exact proportion with the rest, otherwise there will be a dimness about some parts, though one particular point may be perfectly sharp. A mean term should undoubtedly be taken.

Laughlin, Market St.—I cannot say much for these specimens. The glasses are dirty, and the pictures too light and undeveloped.

Dickerson, Market St.—Daguerreotype gallery, fourth-rate artist. This artist may be able to produce good specimens, but I saw nothing to strengthen the opinion.

Franklin Daguerrean Gallery, Market St.—This is actually a miserable gallery. We would fain pass on without comment.

Williams, Market St.—Nothing but daguerreotypes. Pictures dirty, dim and crying aloud for improvement. May they not appeal to stony hearts.

Tyson, North Second St.—Another very mediocre artist. Perhaps his trouble is in the process.

Hutchinson.—Very superior daguerreotypes, very clean and sharp; greater softness, however, would be a desideratum. His colored daguerreotyyes are excellent.

Martson.—A really tip-top artist. His daguerreotypes surpass. His Ambrotypes are excellent, as also his retouched photographs. This artist has three galleries in the city. I saw some really fine positive photographs, which might place him among the first.

Kline.—This artist advertises "enamel pictures at 25 cents and upwards." The pictures lack clearness and tone, but I will admit they are worth the money.

Newcome.—Here we have an excellent artist again; one whose pictures please, possessing all the attributes of good pictures. In the course of time, this artist bids fair to be among the first. There is not a picture in his gallery which does not excel. How different from many of his neighbors. I noticed several splendid positives, among which a portrait of a child taken after death is really well done. This artist should go into Chestnut or Arch Street, to be appreciated.

Lovatt & Snyder.—Passably fair pictures, from the situation of gallery &c., should suppose it was for the accommodation of the lower twenty.

Sailer.—We must pass this artist in silence and tears.

Keely.—Pretty fair daguerreotypes, clear and sharp. Seems to be a working gallery.

Rest.—A very good little gallery, somewhat different from the last named, as the name of the artist would imply.

Bower.—An artist of the 4th class, though some of the specimens range above this. This only goes, however, to show that good pictures might be taken, if sufficient attention were given to the manipulations. There was also great lack of cleanliness.

Fly.—I noticed some pretty good daguerreotypes, and some pretty poor ones, some pretty clean ones, and some pretty dirty ones, evidently evincing a varied taste.

Howell.—The daguerreotype specimens in this gallery, were very unworthy any one calling himself an artist. I can only say, that such pictures as we generally see, are enough to make true artists blush for their art. This does not apply especially to this gallery.

Taylor.—This is a very good gallery, superior to most others. Principally daguerreotypes.

Joslin.—Pretty fair specimens of daguerreotying.

Hutton.—This is a neat gallery, and the pictures are clear and clean. Specimens somewhat above the common order.

Waterman & Johnson.—Very excellent ambrotypes, everything got up in the best order. Noticed no photographs on paper.

Wood.—This gallery is extremely dirty, and the pictures consequently very poor. Of these sort of galleries I can say but little.

Black, Eighth & Carpenter.—Evidently a child in the art, whom I mention in order to keep my list correct.

Mlle. Gunn.—A lady artist. Success to her, whatever her faults.

Lachman.—A mediocre artist. The gallery has no arrangement or order. The pictures are therefore not of the best.

Reimer.—Is a first rate artist. Some of his pictures are in the first style of art. Especially his photographs on paper. We advise this artist to remove his gallery to a more suitable street.

Clemens.—Some very good daguerreotypes. The ambrotypes not so superior. There were but few however in the gallery.

Smith.—A mediocre artist.

Gilbert.—A tip top gallery. I was highly pleased with the specimens, and was surprised to find such a good artist among so many poor ones. Reimer, Marston, Newcome, and Gilbert, are too good artists for 2nd Street.

Keenan, South 2nd St.—A very excellent ambrotyper. The tone and color of his pictures are very fine as a general thing. Some pretty fine paper photographs, which speak the artist. There is need of much improvement, however, in this establishment.

Taylor.—This artist takes pretty fair pictures. For him is not needed the recommendation of order and cleanliness, as the gallery is perfect in this respect. The pictures, however, require greater depth of tone. The gallery is opposite the market, which is not a very good location.

Clayton.—These specimens show a gradation from indifferent to very good, proving the artist capable of producing fair pictures. This artist has several stereoscopes in front of the door, which I noticed was the case with several establishments. This is undoubtedly pro bono publico.

Winter.—Some of the specimens are good at a stretch—but speaking of the gallery in a general way, we should pass it by in silence.

Bennet, Eighth St.—We have here the highly valuable 25 cent picture, suitable for those who like rough sketches.

Colton.—A pretty good gallery, if better arranged and more care given to manipulation.

I have given here, Mr. Editor, the rough notes taken in the galleries themselves. They were written on the moment, and at the first impression. I have been unjust to none in my strictures, and if incorrect in any one point, it is that I have not done sufficient justice to the deserving, nor found sufficient fault with the undeserving.

Cuique Suum.

Personal & Art Intelligence.

— "I notice whenever you have spoken of photographers in your Journal, that to make plain prints that require no retouching is most worthy of the highest praise."

Thus writes a correspondent, and we take the paragraph by way of a text to a few comments upon the subject. To take a photograph that shall be perfect in all its parts, in tone, color, roundness and the proper degrees of gradation in light and shade, should be the highest aim of every Photographer. To do this, mere mechanical skill or chemical knowledge is of no avail, it requires an eye for color and an artistic taste. It requires a reasoning faculty above the ordinary power of the common mind, which even education will not impart; a delicacy in the perceptive organs which can only be imparted by a natural love for the sublime and beautiful. In all else, some may be perfectly ignorant, and yet detect the slightest departure from the rules which govern true art. In photographic manipulation, it is necessary to the production of a perfect picture, to fully understand the proper degrees of depth of shadow to which a picture should be brought to form those pleasing contrasts to the lights that in nature gives it all its charms. It is necessary

to distinguish between that clear transparent tone, without which a picture is dull and meaningless, and those thick, muddy tints which destroy otherwise good photographs. It is necessary that the photographer should be able to produce a gradation of light and shade that will not be marred by the slightest abrupt termination. Hence it is when we see a photograph possessing all the qualities here enumerated, and none of the defects, that we set the man who produced it down as deserving of the highest praise. Almost any one who can clean a glass plate, coat it with collodion, plunge it in a silvering solution, draw a focus, and by consulting his watch obtain, an image, can produce an impression fit for the colorist, to be worked up by his pencil to the most exquisite degree of life-like detail. When it leaves his hands it is no longer a photograph, but a fine painting, and owes all the merits its possesses to him. The photographer is thrown entirely in the shade, swallowed up, as it were, by the painter; and what merit can be bestowed upon him, or can he take to himself? All we can say is, that he has been of great assistance to the artist in obtaining a good likeness. A photograph, on the contrary, coming from the photographers' hands, perfect in all its details, although it possesses but two colors, at once stamps its producer as a man of genius in his art; as much so as a perfect painting, or piece of statuary, points to a master hand in those branches of art. This is the reason that we place those who can produce photographs that cannot be improved by the pencil of the artist at the head of their art; and why we consider that they are more deserving of praise than those who merely assist the painter in his labors. It should be the aim of every photographer to produce these results. Such is the character of the French photographer, and in the exquisitely beautiful views he presents to us we see the results, as well as wisdom of the principles he works upon. Those in this country who follow his example are not behind him in portraiture, although they have much to learn in landscape.

— We hear that the patentees of the Ambrotype process have instituted proceedings against Mr. Brady of this city, for the infringement of their patent. We are not sorry for this, as we feel convinced that the claims set up will be thoroughly canvassed by our court here, and the true merits of the case brought out fully. But it seems to us that the patentee has been unfortunate in the choice of his victim, (?) as it is a well known fact that Mr. Brady holds in his hands such instruments of agreement as give him a perfect right to use the patent if desirable or profitable to himself; and it also seems a well known fact that the agents of the patentee have used his name to a great extent to enable them to sell rights to country operators, supposing, as they well might, that the fact of so distinguished a daguerreau having purchased a right would give confidence in the patent to others, and we have no doubt that many purchased on no other ground. The right by which Mr. Brady claims the use of Balsam of Fir, is an agreement made with one of Mr. Cutting's agents, which agreement was violated by a subsequent sale to another party, a sale which, under the circumstances, and in all its bearings, cannot be sustained by law against Mr. Brady's right. We understand that many have been induced to purchase Ambrotype patents by the representations of those interested, that Mr. Brady had done so. As this fact, if proved, would go far towards settling the difficulty in question, it is to be hoped that all those who have been induced to purchase will communicate with Mr. Brady on the subject. But this suit has greater importance than the settlement of a personal dispute; because the attempt to establish the right to patent the use of bromides and balsam of fir, will be met by very strong evidence in opposition. It has recently came to our knowledge that Mr. Perry—and he says he can swear to the fact—sealed glasses together with balsam of fir for stereoscopic purposes some five or six years ago, and that Mr. Langenheim is cognizant of the fact. This being so, where is the originality? Surely not in the patentee. As to the use of the bromides in photography, there cannot be the slightest shadow of claim on the part of the patentee, as we can show at any time, by formulas published long prior to the time of discovery claimed by Mr. Cutting. We shall be prepared to report this trial in full when it comes off, and we have an idea that our readers have something good and wholesome in store for them.

— C. Dart.—Mr. Simons is right—the claim is simply and solely for "*balsam of fir*," not the slightest reference being made to "any other analogous substance." Matters have come to our knowledge that shake our belief, heretofore expressed, that his right to even *balsam* is genuine.

— Webster & Bro.—You will find a formula in the present number, which we think may assist you out of your difficulty. Also add more nitrate of silver to your bath. In similar instances we have known this alone to be sufficient to correct the evil. You should have an actino-hydrometer with which to test the strength of your bath.

— Thompson's Patent Bromine Box.—"The improvement consists in the construction of the coating box and jar, in the usual known form, excepting that about midway in the jar, and parallel to the bottom, is fixed a porous diaphragm, while beneath the diaphragm and in the bottom of the jar, is an orifice, surrrounded by a projecting neck, which is connected by an Indian rubber tube with a flask beneath. In using this apparatus a few ounces of slacked lime are scattered upon the porous diaphragm in the jar, and the flask at the end of the tube is partially filled with bromine, when the vapors spontaniously rise, pass through the tube into the lower chamber of the jar, and are thence slowly filtered through the diaphragm, when they are absorbed by the lime, and supply the place of those vapors which have been previously given off in coating the plate. That is to say, such is the continuous action *after* the lime has been sufficiently impregnated with bromine, which may be at first effected by the application of a spirit lamp to the flask.

"By means of a very simple but effectual arrangement, attached to the tube, the amount of bromine vapor admitted to the jar may bs so regulated as to keep the *supply equal, to the demand.* In this manner the bromide of lime is kept of uniform strength, and the operator enabled to work with more uniform and certain results than by any other known process."

We do not know what Mr. Thompson claims as patentable in this box, but if he will turn to p. 107, vol. vi., *Photographic Art-Journal*, he will find the principle upon which his box is constructed laid down, and in which a very lengthy description, with directions for constructing such a one are given.

— F. White.—Your suggestions in relation to the Photographic Exchange Club are good. It would certainly be cheaper and easier for each member. Mr. White suggests that the photographs be sent by mail every two or three months, as may be most convenient to the artist. They can be enclosed in a large envelope, and mounted by the recipient. Thus far the photographs have been received by us and sent off again in such a manner that we have at last lost all recollection of to whom we have sent them and to whom not.

— L. W. Keene.—Your model has been received. The principle has been applied to the plate shield and found to work very well. We will try it as you propose, but we have our doubts as to its working any better than when applied as mentioned.

— Bolles & Cummings.—We feel under obligations to you for the information given, for there are no class of men in the business we so thoroughly despise as those who in any manner depreciate the value of the art, or who attempts to injure his brother artists by such low and vulgar means. Had we known his character before, we should not have assisted him in the manner we have, although by doing so, we did not—and do not—necessarily endorse his assertions. Our Journal, however, is not established for the benefit of one or two, but for all, and for us to decline space for what might give offence to another, would be unjust, and having gone thus far we have but one course left in order to preserve that character for impartiality which we have always endeavored to maintain. Send us a copy of the book.

— Those who have sent us money for Mr. Root's new work

on Ambrotyping, will receive their copies as soon as issued. Mr. Root promises new matter that will amply repay all for the unusual delay. The cause of this delay lies entirely with Mr. Root.

— We notice two photographic patents granted during the month of March, viz: "*For Photographic pictures on Japanned surfaces*—to Hamilton L. Smith." The claim is—"The obtaing positive impressions upon a Japanned surface, previously prepared upon an iron or other metallic or mineral sheet or plate, by means of collodion—a solution of a salt of silver or a camera." This principle may be new, but the idea is as old as Daguerres' first experiments—bituman of Judea being used by that distinguished savan as the coating of tin and copper, and as the sensitive film.

— The second patent is to J. F. Mascher for a stereoscopic book, which is really a very neat and convenient article. We have given a full discription of it in another column.

— We clip the following lively and commendable notices from St. Louis and Petersburgh papers:

Fitzgibbon's Gallery.—An hour more fertile in entertainment and instruction could scarcely be passed in any public resort in our city, than in rambling through the extensive collection of daguerreotypes, ambrotypes, portographs, &c., to be found at the establishment of Mr. Fitzgibbon, at the corner of Fourth and Market streets. It is in fact a perfect museum, embracing life-like portraits of many of our distinguished citizens, and celebrities who have visited our city during some years past, likenesses of Indian warriors of the various western tribes, and a series of views in California, not only of great interest, but also of great historical value, as illustrating a phase of life now rapidly passing away. The whole establishment is probably the most complete this side of New York, and we doubt whether even the great metropolis itself can produce anything superior to it.

One is most forcibly impressed with the quiet rapidity with which the happy invention of Daguerre, and the improvements upon it, are thrusting aside a branch of one of the fine arts once so important as portrait painting. Ten years will not pass away before it surrenders itself unconditionally to an art which produces, not the shadow and faint reflections, but the almost speaking and breathing image of the party to be represented. We might devote columns to the descriptions of the various pictures on exhibition at this gallery, but as it is at all times open to visitors free of charge, we can better accomplish our purpose by recommending those of our readers who have not seen it to visit it for themselves.

The life-size colored Photographs at this establishment are really beautiful. We recognized many faces of ladies and gentlemen that we were acquainted with. The minature size colored Photographs are finished by Mr. J. Brown, of New York, who has lately become attached to this famed gallery, and it gives us pleasure to speak of his skill as an artist. We consider his coloring much more brilliant and softer in tone than any Wenderoth ever did when he was engaged at this establishment. The plain photograph and Ambrotype department we found under the care of Mr. Hill, a very superior artist in his line; he showed us some very fine and superior new style Ambrotypes that are not patented, but excels any patented we ever saw.—

The Daguerreotype department we found, as usual, under the charge of Mr. Hayes whom we have spoken of before. Fitzgibbon himself was busy as a bee waiting on the ladies, sitting Daguerreotypes, Photographs, teaching pupils, up stairs and down stairs almost at the same time, having a pleasant word for every body in and out of the different departments of his large establishment, which consist of thirteen rooms, giving orders and seeing that all was in order. This gallery is a study for a philosopher. Ten years ago Fitzgibbon came to St. Louis, and opened a little gallery on Fifth Street. Behold the change! Go see what perseverance and industry will do, and have your picture taken.

Minnis' Gallery.—In an important sense, Minnis has arrived at that degree of skill in the Daguerreotype business which places him beyond the need or necessity of what is commonly understood by a "puff." His beautiful creations of Daguerreotype and Ambrotype are his best advertisements, for they *tell the truth invariably*, while a lie or so, nicely put in, is considered admissible sometimes in flaming notices and displayed advertisements. We will rest our reputation for taste on the assertion, that Minnis' gallery is one among the most delightful retreats which the city of Petersburg affords. You may go there at any time, and you will be sure to meet with a score of beautiful ladies. This circumstance of itself is abundant evidence of the attraction of the place. You can moreover see a thousand strange faces; old men whom you have long wished, but have never been able, to see. You can seat yourself on one of those pleasant sofas, rest your limbs, look at yourself in one of those large mirrors, or entertain yourself with choice books, &c., &c.—But if you go there on *business*, which you ought always to do, you can obtain a copy of your good looking self, which you are bound to admire, if you have any self-love. This is enough, is it not, for small pay?

— Mica in Photography.—Several claimants have arisen as to priority in the use of this article in photography; so we might as well put in our claim, having suggested it to Mr. Sutton, of Detroit, about two years ago. Some one should have a patent for it. Mr. Zealy sends us the following as his method of using it, and being the first to communicate to his fellow artists what will undoubtedly be new to most of them, we award him the patent right to the good will of all honest hearts, as well as our thanks.

Friend Snelling,—I will now tell you how I use the Mica. In the first place I split it very thin, then with a little dissolved shellac I touch the corners and lay it on a glass, one-ninth or medium size, and put a clean piece of silk (say handkerchief) smoothly over it. Then place another glass over the silk, and put a weight on it, and let it stand until dry. Just before using it wipe it with a clean handkerchief dampened with a little absolute alcohol; it is then ready for the bath. You may publish this if you wish, as it might be of some use to my brethren. Some of my friends wish me to patent it, but I think otherwise.
Yours truly, Jas. T. Zealy.

P.S. I have been experimenting for some time to find what would do best for the above. I put them in hats, watch lockets, &c. After coloring I put a very thin piece of mica and on it put one drop of Canada Balsam, and place the other right over and lay it under press; this protects the picture. I have written this in haste and do not know if you understand it, but I hope you do.

— Complimentary to a Virginia Lady.—A French paper says: "Among the Daguerreotypes on exhibition in the gallery of art in the Crystal Palace, at Paris in 1855, and which took premiums, was one from P. T. Barnum's collection, the likeness of a young lady in Virginia, United States of America, and which was purchased by Lady Morgan, of England, for $50." This lady we understand, is Miss Martha Hanes Butt, of Norfolk, and the likeness was made at Mr. J. H. Whitehurst's Gallery at Norfolk, Va.

— We have just received a batch of delectable advertisements, which have passed between Messrs. Fox and Moore, of St. Louis, Mo.; but we must be excused from copying them into our columns, as they are of too vulgar and disgraceful a nature to be admitted. The names of those who would write such stuff for the public eye should be held up to scorn by every respectable artist.

— Our illustration for this number is an exterior view of the great building in which the "World's Exhibition" of Arts and Manufactures was held during 1854, in Paris It has been often described in the public prints, that our readers must be quite familiar with it by this time.

— We would call attention to two advertisements in this number for situations. Both gentlemen are accomplished in the art.

PALAIS DE L'INDUSTRIE.—INTERIOR VIEW.

Negative by Meade Bros.

From the London Art-Journal.

SUGGESTIONS OF SUBJECT TO THE STUDENT IN ART.*

BY AN OLD TRAVELLER.

CHAPTER III.

The beloved Physician—The House of the High Priest—Who shall paint the Picture?—The Tuscan Masters—Fra Bartolommeo—Il Beato Angelico—The Schools of Umbria—Perugino and his Disciple—Leonardo—Sant' Agnese fuori le mura—Camoens—"The True Servant of his Master"—Philippe le Hardi—German Writers and the Artists of Germany—A Picture from Uhland—The Invitation—An Interior of Elizabeth's Day—"Mounsier his Physnomie"—The King's Visit—An Impediment—Pictures from Cervantes—A Murcian Inn Yard—The Search—An Arrest—The Rhodian Swallow—Children of the Greek Isles—A worthie Race of Dogges—The Heir of Branksome—Masters of Hounds in the Olden Time—Gaston-Phœbus—Barnabò Visconti—The Beagles Tragedy.

THERE is a passage in the writings of the Syrian Evangelist—"the beloved physician"—St. Luke, for whose profoundly touching uses neither Painting nor Sculpture has yet supplied an adequate exponent. Nay, recalling the wide and various import of those words, it may be affirmed that human art could scarcely avail to give them their full effect, whether in marble or on canvas: but honored should be the artist, and proud the land of his birth, who should come but near to that heart-moving picture which the mind at least has power to call before it, when we read or listen reverently to the words in question. They are these:—

"And the Lord turned and looked upon Peter, and Peter remembered the words of the Lord." †

The extent to which the hall in "the high priest's, house" with the various figures known to have been present, and other accessories, shall be brought into the picture, must depend on the individual feeling of the artist; the moment which, in the writer's mind, has ever absorbed the whole interest, is that of the utterance of those words—never to be repeated but with the lowliest reverence—"And the Lord turned and looked upon Peter, and Peter *remembered.*" Alas, for the agony of that remembrance! a pang deepened by the divine goodness of the pardon, beaming its gentle assurance from the sacred features of the Master, even while his unhappy follower stood self-condemned, as he lifted his tearful eyes to their light. No; we can never hope to have all this set before aught but the eyes of the mind and heart; nor for these, save in their best and purest moments: I despair of any worthy result, now or ever.

Do you differ from me? You, young, trusting, faithful; who feel that Art is a religion, and that none is worthy to serve at her alters who has not faith in the supremacy of her power. Be it so; and thrice welcome is your conviction, for who shall set limits to what such trust may accomplish?

You believe then that there are artists in the world—no matter to what country they may belong—so richly endowed that even for this high and holy task, this labor of pure love, they may find heart, and head, and hand, that shall prove sufficient? But read again, and you will feel that to assert so much would be to declare that all the noblest qualities demanded by Art in her most exalted phase, may be found combined in the person of one artist—for he who is to succeed must possess them all.

Have you ever seen a head of the Savior that did not fail to give you entire satisfaction? We might even use less gentle terms, and say, that did not disappoint and chill you? It has at least not often been the writer's good fortune to escape these results, when standing, after long cherished wishes, and with high-raised expectations, before a work wherein the delineation of the sacred form and features have been attempted, whether in painting or sculpture; yet, in speaking of the latter as well as the former, there is present to my recollection more than one work of great celebrity, and by renowned hands.

From the narrow and ascetic schools of Spain you will not hope much; but there are certain among the Tuscan masters who cannot fail to present themselves to your memory in reference to this subject. Fra Bartolommeo will stand prominent, yet not first, in the group, and there are works of his in Florence and at Lucca,‡ that might almost justify your thought; but pass through the Pitti Palace, where some of his finest paintings are to be found, and, admirable as most of his pictures are, it does not appear to me that even the "Christ after his Ascension," highly meritorious though it be in very many respects, could wholly satisfy you of his sufficiency for our present purpose.

Of Il Beato Angelico, it may be affirmed that beyond any other master he was worthy to undertake this sacred task; and if pure holiness of purpose, a seraphic devotion, the most lowly reverence, the utmost tenderness, could ensure success, for this—which being eminently a labor of love, and work of the heart, would require all those qualities—in Fra Angelico da Fiesole they were all to be found, and he must have succeeded. Then, you examine his works in Perugia, or you visit the chapel of Pope Nicholas, in the Vatican,§ or the Gallery of the Academy in Florence,¶ or you linger long before the frescoes of Orvieto,** and from each of these places you bring recollection of grace and beauty, holiness and sweetness of expression, which force you to shrine this master in your heart of hearts; insomuch that when these qualities are in question it is to him that your memory first, nay, almost exclusively recurs; but have you the force and grandeur that you also want? Have you the sublime repose you seek, the dignity and divinity of pardon, the superhuman perfection of all holy attributes that you must equally require? I fear you have not; and wanting these, it is not from Angelico, warmly admired and deeply beloved though he be, that we may hope to obtain the work we look for.

But the prince of painters,—but he of whom it has been truly said, that in him "beauty of form is the expression of elevation of mind, of utmost purity of the soul"††—even Raphael; surely, you will perhaps say "from his hand we might have hoped whatever the most devoted disciple of our Lord could either imagine or desire."

To this I will but reply, that if, for the greater glory of Art and the happiness of his contemporaries, Raphael had been permitted to delight and benefit his kind some ten years longer, he might, without doubt, have achieved whatever human power could or can accomplish towards the object we meditate.

You do not name Il Perugino—you omit all mention of him whose light, deservedly brilliant, was yet much dimmed, if not eclipsed by that of his greater disciple, as we find remarked by more than one writer. But if you examine his works, at a period when he was yet untouched by those injurious influences which undoubtedly ruin the efficiency of this painter, you will admit that he has not always received full justice; and if not meet for the work we think of, he is at least well entitled to take rank among the first of the Umbrian masters. We have not space for the citation of particular instances among his numerous—too numerous—works, in proof of this assertion, but without going beyond the walls of the Florentine Academy, you will find enough to convince you that the obligations of Raphael to his early master have been frequently underrated.

Loud and long have been the plaudits that have ever followed the name of Leonardo da Vinci, yet has he never had all the praise due to his deserts—has not and cannot have, for if

* Continued from p. 97.

† Gospel of St. Luke, twenty-second chapter, sixty first verse.

‡ Among others, the "Madonna della Misericordia," in the church of San Romano, with another Madonna, having St. Stepen and St. John beside her, in a chapel of San Martino, a church of the same city.

§ Where there are ten fresco-paintings, from the lives of SS. Lawrence and Stephen, many of them unhappily much injured by restoration.

¶ Scenes from the life of Christ, formerly in the Sanctissima Adnunziata, the convent of the Servites, in Florence. A "Deposition from the Cross," with figures in pyramidal compartments, attributed to Il Monaco (Don Lorenzo), and many other works by Angelico, are to be found in the Gallery of the Florentine Academy.

** The subject of these works is "The Last Judgment;" they are in the chapel of the Madonna of San Brizio. In the Corsini Palace, in Rome, there is also a "Last Judgment" by this painter, with whom the subject was a favorite one.

†† See Kugler's "Handbook of Painting," with the valuable notes of Sir Charles Eastlake, Part ii., p. 326.

the life of the most enduring patriarch had been doubled in his instance, he could have filled it all with glory. What then was there wanting to Leonardo? He wanted leisure; and that notwithstanding his length of days. Courts and Kings came between him and his genius; and here I do not allude to the universality of his powers and attainments, a quality in which he was never approached, I am content to abide by what he was, as relates to the formative Arts only, and I say that, when left to his own inspirations none could surpass him. To name but one proof, out of many that may be given—go to Milan, and in the Gallery of the Brera you shall find a work which, although but a sketch, may serve appropriately to illustrate our present position, since it is a head of Christ, believed to be a study for that now ruined treasure, Leonardo's "Last Supper." Beautiful things by the same master are also to be found in the collection attached to the Ambrosian Library, in the above-named city; but for the moment they must all be left unspecified.

There is a small bust in marble, standing on a lonely altar in the subterranean church of Sant' Agnese, beyond the walls of Rome, and popularly attributed, but without sufficient authority, to Michael Angelo. It does not remind you of the great Florentine, and there is much to desire in the work, but the expression has a beauty of holiness too often sought in vain.

"I am ending the course of my life; the world knows, and will one day bear witness to the truth, that I have dearly loved my country; I have returned, not only to die in her bosom, but to die with her."

Such are the words of Camoens, uttered at the close of his varied life. It is still of Portugal he thinks, not himself; heart-broken for the ruin he saw clearly to be impending over his native land, the patriot-poet forgot, if he did not disdain to mourn over, his own sorrowful conditions. Let us see how his country repaid him.

Through one of the most frequented streets of Lisbon a buisy population is pouring its noontide stream: priest and soldier, peer and peasant; and high-born dame and the dark eyed maiden of lowly birth, her loveliness and sweet goodness her sole dower; the crutch-borne grandsire, bent with age, and the dancing child caring for none of these things; you have here whatever a great city has to offer; but the interest of the whole is concentrated —for you—on the head of an aged begger, whose whitened beard decends from a face of beautiful expressions, although he may not boast the features of the proud Caucasian races.

For this is the Javanese servant of Luis de Cameoes: of Camoens "at once the Homer, and the Virgil of Portugal." He is begging for the morsel that is to sustain the life of his master during the few short days yet to intervene, before the most illustrious bard of Lusitania shall die miserably on the flock bed of the public hospital. Too scanty, alas, is the pittance accorded; and the brave soldier, the enlightened patriot, the inspired poet—for Camoens was all these—sinks untimely despite the faithful cares of his follower. Do not let the devotion of that true servant to his master be forgotten. Time—the all-restoring, no less than the all-destroying—has offered to the Poet such reparation as Fame may give—the follower yet awaits his guerdon, let the hand of the artist weave the chaplet for *his* brow, and be certain that it shall not be placed on an unworthy head.

The causes are assigned for the epithet "Le Hardi," bestowed on Philippe, son of John of France, the incidents are not in either case illsuited to the purposes of the painter, and you shall have them both.

At the Battle of Poictiers, the Dauphin and his two brothers, the Dukes of Anjou and Berri, were prevailed on to leave the field, even while the conflict was still raging; thus they may be said to have abandoned their father, who was hotly engaged in the midst of the strife; but Philippe, the youngest brother, then but sixteen years old, refused to accompany them, and close to his father's side: severely wounded, he yet fought on, and was taken prisoner with the King—a result which at that period, and with his feelings, the young prince must have detested more than wounds of death.

For his brave defence of his father on this occasion it was that, according to some writers, he received the name of Philippe le Hardi; others declare the following incident to have given rise to the appellation.

While at the English Court, Philippe was in the habit of attending, with other young nobles,—and as was the custom of the time—on the two kings as they sat together at table, when he remarked that one of his companions, an Englishman, and subject of Edward, presented the viands to his own Sovereign before offering them to the King of France. "Thereupon," as an old writer on the subject hath it, "this prince up with his fist and dealt that youth a *wherret* on the ear, saying—'How now! hast thou dared to serve the King of England while the Monarch of France sits at the board?'"

The affronted noble drew his dagger, and raised his hand to avenge the blow, King Edward, hastily extending an arm, drew the French prince within his clasp, and commanded the justly-enraged assailant to forebear. Then turning to John, who was an anxious spectator of the scene, he exclaimed, with a friendly smile; "We must call this boy Philippe le Hardi; we may be sure that he will know how to justify the title."

Now, the battle or the buffet? one or both. There is no lack of interest in either picture, nor any danger, methinks, that you should suffer the salient points of either action to escape you.

The artists of Germany do not let the words of its writers fall unheeded to the ground; least of all could Göthe complain of inattention on their part to such oracles as it pleased him to profound.

Here is half a line, written from Velletri, in a letter, dated 22nd February, 1787, in which the author simply uttereth the following. He is speaking of Prince Chigi's seat at Aricia, and he says:—

"Es Gäbe das gröszte Bild, wenn es ein rechter Künstler unternähme." "This would furnish the finest of pictures, if a true artist would undertake it."

On this hint it is that Oswald Offenbach, an exhibitor in the German Exhibition held in London last year, has spoken; his landscape—seen by the present writer at Vienna in 1852, but mentioned principally in illustration of the remark made above —is an Italian scene of well-known features, and will rise before you without further description. We will presently show that our own oracles yield responses by no means less significant than those of the great German; nor will we be negligent in the consultation thereof, when the propitious moment shall arrive: but for the present occasion, we too will seek our picture among those painted by the pens of our Teutonic cousins.

And in Uhland we find one, still a landscape, but appealing to a wider range of sympathies than that so faintly intimated above; if not for itself, yet certainly for its figures, and for the universal interest of that feeling which animates the speaker, and is as clearly shared by the listener, of the group. It is in "Die Einladung"—"The Invitation," that we find it, the words are these:—

"Ich hab' ein kleines Hüttchen nur,
Es steht auf einem Wiesenflur,
Bei einem Bach, der Bach ist klein,
Könnt aber wohl nicht heller seyn.

The following may be accepted as a translation sufficiently close to give the features of the scene, with the relation borne by the actors to each other; a cordial and pleasant one, as ye shall see in a summer day's journey:—

"Mine, dear one, is a poor cot only,
'Tis in a vale, flower-gemm'd and lonely.
There's a glad streamlet dancing near,
A rude wild thing, but crystal clear."

Then follow two stanzas concerning a tree and a nightingale; but these, if you be so minded, we can "prætermit." The conclusion is as follows:—

"Du kleine, mit dem Blonden Haar,
Die längst schon, meine Freude war.
Ich gehe; rauhe Winde wehn.
Willst du mit mir ins Hüttchen gehn?"

"Sweetest! with locks of golden sheen,
Thou who hast long my sole joy been.
Lo! I depart. The chill winds blow.
Wilt with me to my poor cot go?"

And she *will* go. The earnest-looking suplicant is not doomed to refusal. He may say with the Muscovite lover—

"'Tis not to-day that first we tell
How long our hearts have loved—how well."*

And the maiden? She is no mere "yellow-haired lassie"—the sweet girl! the "goldeu sheen" is on locks of a soft clear brown; but they have it, and to perfection, that sheen. Do not believe the lover's partial eyes are seeing what exists only for them; look for yourself: —that is a veritable golden glow on those rich brown tresses; but, much better than this, she lifts trustingly towards the face of the speaker a pair of the most heart-warming eyes—deep their blue, with a tinge of the violet, and a tempering fringe for dark lashes: *these* give comfortable assurance that the hope of her frauk-looking manly suitor will not be rendered vain, uow or hereafter. What a firm, yet elastic, step, too, is that with which she draws yet nearer to her lover's side: the figure is worthy of the face which gives a thousand pleasant promises in its somewhat serious, yet sweet and cheerful aspect. Nor is the winner of this prize unworthy of his fortune: you see well that he is the proper counterpart of that fair girl: wherefore, let us give them our benison, and leave them to their happiness.

Meanwhile we may bestow a glance on the place of their abode: and you see that in addition to the "Vale"—charmingly framed in by fine heights, where the stream does not close its bounds—there is a delicious "distance,"—and across a glade of this, you may perceive a doe with her fawn, passing slowly. It is then veritably a "lonely" dwelling, that you can but just discern, partially appearing beneath the graud old oaks;—so much the better: aud blessed be their lot therein, the winsome pair.

Highly worthy of the painter's attention, and not unfrequently chosen by our artists for the varied effects they preseut, are the rich and quaint Interiors of Elizabeth's time; and here is one of the Palace of Theobalds, which combines almost every attribute, whether of form or decoration, wherby these gorgeous rooms attract to themselves so large a share of the artists regard.

A chamber of ample space it is, and exhibits due harmony of proportion: the prevailing tints are deep and warm; and, for the moment, the place is tenated by a fluttering bevy of fair damsels, eagerly clustering about a table whereon are placed rare caskets of Italian workmanship. One of these stands open and displays the jewels, brought, without doubt, by the dark-looking figure, in southern garb, who is evidently "waiting her Highness' pleasure.

Elizabeth herself no longer young, is seen walking slowly along the terrace, which is visible from the open windows of the room. She has been interrupted in her examination of the "Gauds" by some less agreeable occupation; her head is bent thoughtfully, and she seems to be listening in some displeasure, to the ancient noble, whose step follows her own at the distance of less than half a pace: he is, in fact, all but walking beside her.

This group offers a notable contrast to that gathered around the stranger,—a Venetian merchant, perchance, admitted to his high presence in consideration of the rariety and great value of the productions enriching his caskets. Towards oue of these, still closed, a fair and curious finger is pointed, as if the owner would entreat that its contents might be given to her view; but the matronly dame, who is extending her protecting hand over the lid, while she turns a warning glance on the stately figure without, seems to recommend discretion, until their royal mistress shall return to set the treasure free.

In the right hand of the merchant is a jewel which fixes general attention, and if not that very "littel floure of gold, with a frogge thereon and therein Mounsier his phisnomye,"—the said "phisnomye" believed to be a portrait of the Duke D'Alençon, afterwards Duke of Anjou, and one of Elizabeth's most nearly successful suitors—it is yet manifestly worthy of all consideration, in the eyes of the group by which its fortunate exhibitor is surrounded. The left hand of this personage holds a "pomander-box" not unlike to that "cunning flasket of amber, with a foote of golde and on the top thereof a beare, with his ragged staffe"—the device, as our readers will remember, of the Earl of Leicester—which was also among the possessions of Elizabeth in that day when her "three thousand gownes" had all to be resigned for the narrow garments of the tomb.

Fallen from the open casket and lying on the table is "A cawle of gold, with nine true loves of pearl and seven buttons of fine gold, with, in each button, a ruby," and beside this desirable decoration lie certain "nutte-crackers" also of gold, having "diamond sparkes to garnish the heade and pointes thereoffe." Other and equally delectable contrivances there are, "happy woman be her dole" who is privileged to behold, what then to call herself mistress of such!

But some topic scarcely less absorbing, is surely in discussion by that youth, half-concealed in the shadows of a distant window, or he could scarcely have indueed the bright girl who listeus, to abandon the dear occupation of her companions. She glances towards the terrace, where paces the grim majesty of England, but Elizabeth is happily intent on other cares, and so the colloquy holding in that deep recess may proceed to its obvious results. Numerous accessories heightened the interest of the picture, as Imagination presents it brightly to the view, but these will vary to infinitude, as the taste and character of him who paints shall vary: wherefore we need not further iudicate such as "our own poor fancy" furnishes.

Continuing to stay at home at ease—let us nevertheless vary our ground to some extent, and see whether the romantic annals of the mother-laud may not furnish us with a subject that shall enable some aspirent to a name in the future to show us how fire should be exhibited on canvas. There is a well-authenticated fact, closely germane to the matter, among the not always praiseworthy *Gestæ* of Henry VIII., and as it does uot appear in the general history of the period—although conspicuous in its local records, the story is believed to have escaped the notice of our painters.

Among the rich possessions of that lovely Joan Plantagenet, whose poetical appellation the "Fair Maid of Kent," will perhaps be best known to our artist-readers, was the manor-house of her materaal ancestor, Baldwyu de Wake, which, having been strongly fortified by Thomas de Wake in the early part of the fourteenth century, was theucefoth known as Baynard Castle.

It was perhaps about the third decade of the sixteenth ceutury, and when the dangerous vices of our eight Henry's later life had rendered his nobles cautious of their monarch's approach to the sanctuary of their homes, that the then Lord of Baynard Castle—still a De Wake—had taken to himself a beautiful bride with whom he their lived in close retirement. Rumours of the lady's loveliness had not failed to reach the court, and Henry, visiting his northern cities, resolved to judge for himself as to the justice of the praise bestowed on it,—thus he despatched a messenger to his great feudatory, giving the latter to know that ou the day following the one which saw the missive reach him, he might expect the honor of a visit from his sovereign.

But De Wake knew the character of the perilous guest proposed to him; therefore it was that he avoided the court, and he was firmly resolved that no breath of suspicion, such as might well be apprehended from the menaced visit, should pass over the fair fame of his wife.—Yet how decline the proffered distinction? He could invent no pretext, discover no means for doing so—the moments were passing rapidly, an early hour of the following morning had been named for the king's arrival, yet night fell and eleven o'clock—an nnusually late period for virgil at that time—found De Wake with the King's letter still in his hand, while he remained wholly undetermined as to the mode whereby he might escape from the danger, which he had nevertheless resolved not to incur.

His fair wife,—to whom he had confessed his apprehension of

* Bobrov, from the "Russian Anteology" of Sir John Bowring.

the King's arrival, but without offending her ear with any intimation of its cause—had long stood beside him, now suggesting some plan—rejected as soon as proposed, then again devising some other method, which had no better fate and anon doing her best to reconcile her husband to an infliction that seemed inevitable.

"His presence will not disturb us long,"—she urged, when, all her simple wiles declared to be impracticable—she became convinced that the visit must be endured, since better might not be—"He will not be with thee more than the second day at most, my husband," she softly said, "then we may return to the quietude thou lovest so well, and forget that ever he came."

But this did not avail to diminish the gloom that had settled on the brow of De Wake, and hopeless of an issue from the dilemma into which they had fallen, the young bride laid her head mournfully on the shoulder of her husband, and burying her small hand lovingly amidst the waving locks on his forehead, she exclaimed, "Now I would that we were but as our good Robert the Forester, and had no kind of dwelling that could lodge this evil king."

Her words were an inspiration! "Thou has said it, sweetheart," returned her awakened lord, and rising hastily from his attitude of despondency he aroused his seneschal, an old and trusted servant of his house, commanding him at once to summon that Robert the Forester, to whose lowly abode the lady had so opportunely referred. For a moment she remained in blank astonishment, unable to divine the manner wherein her lamentation over their inconvenient greatness could avail to deliver them from their strait, but the directions given to his senescal by her husband, soon made her sensible to all the value of her words, and after a few hours spent in the needful preparation, she was led forth by De Wake to a bold elevation at a safe distance from the home whose splendour she had bewailed, and which they presently beheld blazing at all points.

Morning found a high-born pair without any dwelling wherein they could lodge you "evil king;" they were reduced to accept shelter from Robert the Forester, and as his hut could not suffice beyond the first moments of necessity, De Wake was constrained to bear his wife to a distant abode, having duly notified to the approaching sovereign that untoward mishap whereby the honor of a royal visit had been for that time lost to his house.*

There is more than one point of time in this narrative, sure to recommend itself to the pencil of the painter. Even to the duller and less imaginative eyes of the writer many pictures arise, as he reproduces the old story, and to the choice of the artist we leave them. Three daughters inherited the beauties and excellencies of this fairest lady—whose maturer life proved her to be wise and good as well as lovely—but she had no son and each of the three carried a portion of her broad lands into a noble family whose name still remains to such portions in attestation of the fact. The Duke of Richmond, the Earl of Westmoreland, and the Lord of Powis were the bridegrooms of those maidens respectively, and the lands received by these nobles with their brides, continue to be called Cottingham Powis, Cottingham Westmoreland, and Cottingham Richmond, accordingly.

Among the shorter stories of Cervantes, less known than his Don Quixote and not so much admired, but works of considerable merit nevetheless, is a tale of a gypsy-girl, which having been translated into English, is in the hands of most readers. Within its few pages are many pictures, and here is one that has at least the advantage of animation.

The scene is in the *patio* or court-yard of the Murcian venta, or inn, where Juana, the daughter of the ventera, or landlady, having fallen in love with the nobly-born *Novio*, or betrothed, of the heroine Preciosa (who lives disguised among the gypsies, to be near his promised wife)—is avenging herself for his refusal to accept her own hand by accusing him of theft, and demands to have the baggage animals of the gypsy-tribe, all loaded for departure and surrounded by their owners equally prepared for travel, unpacked and examined in search of her lost property.

Now Juana had concealed certain of her jewels among the packages of Don Juan, the disguised lover, but, unsuspicious of her treachery, he rebuts the charge with unembarrassed mien. The delicate face of Preciosa, calm in her assurance of her lover's integrity, presents a striking contrast to that of the bold Juana, and even to those of her companions, who are of gypsy-race, while she, as the story has already told us, is, like her lover, highly-born. The old woman, who has stolen her, and who stand near, is in consultation with men of the tribe, varying in age, but all presenting the picturesque forms and handsome features of their race.

The officers of justice, summoned by Juana, are entering the court, and *mozo de la cuadra*† is contending with a gypsy-woman from whose ass he is removing its burthen.

At a later moment in the same incident, there is a second picture of a totally different character, although with the same actors. Don Juan, having received a blow from a soldier, and forgetting all but the dictates of a suddenly awakened rage, has torn the sword of the offender from its scabbard and laid him dead on the spot with his own weapon. "Then do cries for vengeance become frantic yells," exclaims the Spanish author; "then do the Kinsmen of the dead fall on the disguised cavelier: Preciosa sinks down fainting, Don Juan, hastening to assist his betrothed, neglects to provide for his own defence and is seized before he can approach her, while the old hag of a pretended grandmother wrings her brown hands, and the wicked Juana—cause of all the mischief—smiles with the joy of a demon over the ruin she has made."

In all this there is evidently much life and movement; the first of these pictures is perhaps the most attractive, but the second may be preferred by some of our young readers, to whom we leave the choice without further comment.

A custom recorded by that most voracious of readers, and strangely various writer, Athenæus, of Naucratis,‡ as prevailing in his time, and which probably continues to prevail even to our own day, in the more unfrequented of the Greek isles, must needs present many circumstances well calculated to afford matter for the study of the painter.

When the Swallow returns with the return of spring, bright troops of Rhodian children, securing tenderly the first they can obtain, bear the bird with jubilant songs and dances from dwelling to dwelling. They are crowned with flowers, and rejoicing beneath the blue sunny heavens of their delicious clime, they sing the following strain:—

"He comes, the bird whose wing shall bear
To us soft hours and seasons fair,
The Swallow hither comes to rest
His sable wings and snowy breast.

Then from thy flowing wealth bestow
Rich flagons of the rosy wine,
And wheaten cakes of flour most fine.
The ripe fig-cheese within our baskets stow,
And let the Swallow-guest partake
The dainties of thine omelet-cake.

Now shall we empty-handed go,
Or will you give? Say, 'Yes' or 'No.'
If 'No,' then see you guard your door,
We'll take it, pasts and all,—nay, more,
Your dainty wife—'tis mere child's play,
So light she is—we'll bear away.

Give, then, and give with liberal hand,
The Swallow asks, your doors unfold,
No grey-beards we, faint, feeble, old,
But Rhodian boys that on thy threshold stand."

The picture presented by these verses require no further de-

* The reader will be hereby reminded of a similar sacrifice made at a later period by the then chief of the noble house of Campden, but under circumstances of different character. Lord Campden destroyed his Gloucestershire manor-house, to prevent the troopers of the Parliament from availing themselves of its shelter.

† Mozo de la Caudra, hostler or stable-boy.

‡ He is said, by a German writer, to quote more than fifteen hundred *lost* works, and to cite the names of seven hundred authors, many of whom would have remained unknown but for Athenæus.

scription, they "*sautent aux yeux*," as our neighbors say, and very pleasant encountering too.

The love of Sir Walter Scott for every "worthie race of dogges," as quaint Gervase Markham hath it, is well-known; and from his honored hand we have here, what is called by a competent judge, "the best poetical description yet written of one species in action." That species is perhaps not the most amiable or most interesting of its kind, but it is at least among the most sagacious. In any case the words of Sir Walter present you with an excellent picture. They describe the heir of Branksome when lost in the forest, and do their "spiriting" so effectually that not another word needs to be added.

"He journey'd on,
And deeper in the wood is gone,
For aye the more he sought his way,
The farther still he went astray,
Until he heard the mountains round
Ring to the baying of a hound.
And hark, and hark, the deep-mouth'd bark,
Comes nigher still and nigher.
Bursts on the path a dark blood-hound,
His tawny muzzle track'd the ground,
And his red eye shot fire.
Soon as the wilder'd child saw he,
He flew at him right furiously.

I ween you would have seen with joy,
The bearing of that gallant boy,
When, worthy of his noble sire,
His wet cheek glow'd 'twixt fear and ire;
He faced the blood-hound manfully,
And held his little bat on high;
So fierce he struck, the dog, afraid,
At cautious distance hoarsely bay'd,
But still in act to spring:
When dash'd an archer through the glade,
And when he saw the hound was stay'd,
He drew his tough bow-string,
But a rough voice cried, 'Shoot not, hoy!
Ho! shoot not, Edward! 'tis a boy!"

Here follows a prose description of this dog (the blood hound) by an excellent authority of the day:—

"A true blood-hound—and the pure breed is rare—stands about eight-and twenty inches in height; he is muscular, compact, and strong; the forehead is broad and the face narrow towards the muzzle; the nostrils, are wide and well-developed; the ears are large, pendulous, and broad at the base; the aspect is serene and sagacious; the tail is long, with an upward curve when in pursuit, at which time the hound opens with a voice deep and sonorous, that may be heard down the wind for a very long distance.

"The colour of the pure breed is almost invariably a reddish brown, darkening gradually towards the upper parts till it becomes mixed with black on the back; the lower parts, limbs, and tail being of a lighter shade, and the muzzle tawny." Pennant adds—"This dog has a black spot over each eye; but those in the posession of Mr. Astle, known to be of pure blood, have not these marks.

Speaking of hounds in general, Gervase Markham says—"They runne surely, and with great boldness *loving the Stagge* more than any other beast, but they make no account of hares."

Now herein these estimable animals differ widely from those fairy beagles about whom so disastrous a tale is told for these did so *love* the hare, according to Markham's definition of loving—namely, worrying to the death—that they were never known to return from the chase without having "stuck to and worried her at the last," even though they "could never get near enough to press her very closely in the early part of the run."

What marvel then, since such was their beautiful persistence, that their happy and yet most unhappy owner should die of despair when——But we are beginning our tragedy at its close, and must recommence, to proceed "in the forms."

These exquisite little Beagles, (so delicately diminutive that the whole symmetrical twenty-two of them were taken to the field in a pair of paniers on a horse's back.) were one night locked safely in their kennel, with all the care due to their perfections; but lo you, now! what chances? on the following morning was it not found that some thief, or rather some body of conspirators, had forced the door, and that the whole "cry of beagles" had been carried bodily thence? Alas! they had! and since this is but too true, can it surprise us that the disconsolate owner should break his heart? or if he did not actually effect so much, one is almost inclined to say he ought to have done so, and the rather as a more appropriate manner for the dying—I beg his pardon, the "going to earth" of a master of hounds, "well-bred," could scarcely be imagined.

Talking of masters of hounds would remind one, if his history were not in other respects *so* melancholy as almost to darken one's recollections even of Dame Juliana's joyous science,—of that brave, wicked, handsome, horrible Gaston-Phœbus, Count de Foix, whom one knows not whether most to admire and pity, or most to shudder at and abhor, but whose kennels (to keep to our muttons) held no less than 1600 dogs, "worthie" or not, as the case may be, and who made the wilds of his beautiful territories amidst the glorious Pyrenees daily echo with their music.

Hear this, ye Lambtons, Wardes, Beaumonts, and Assheton Smiths, past, present, or to come: ye of our own merry hunting grounds, hear it and hide your diminished heads, whenever numbers rather than quality may chance to be the question!

Yet is even this great "M. H." fairly eclipsed by one of the Visconti, whose dogs amounted to full 5000, and who loved them so much better than his peasants—whose lives were chained to the care of the animals, these last being drafted into different villages, since Visconti had not kennels for their lodgment—that if he found one too lean, he would cut off the keeper's ears, and if another proved too fat, the delinquent's members were equally forced to pay for the mistake: the dismal remembrance whereof shall make this suffice for the subject, which is else one that we might be willing still to dilate on together; for I hold that he will prove but a cold kind of artist who doth not love "a worthie race of Dogges."

(*To be Continued.*)

From the Jour. of the Phot. Soc.

PHOTOGRAPHIC SOCIETY OF LONDON.

ORDINARY MEETING,—MARCH 6th, 1856.

The Rev. J. B. READE, F.R.S., in the Chair.

The Minutes of the last Annual General Meeting were read and confirmed.

The CHAIRMAN,—It was expected that Dr. Percy would this evening commence the discussion upon the paper read by Mr. Hardwich at the Meeting of Feb. 7th, but he is unable to attend.

As the subject is one of very great interest, probably several Members now present will be desirous of expressing their opinions upon it.

Mr. MALONE opened the discussion by regretting the absence of Dr. Percy, and continued,—At the last Meeting I rose in consequence of a remark of Mr. Hunt's. which contained a sweeping condemnation of all that has hitherto been done by photographers as regards the manipulation of the positive process. He told us most distinctly, if photographs were sufficiently washed there was no necessity for their fading, and that where photographs, prepared in the usual way, had faded, it was due to the carelessness of the operator.

I think the majority of those who have paid attention to the art will agree with me, that Mr. Hunt has been too bold in this matter; and that pictures printed on the ordinary letter-paper by means of salt and nitrate of silver, or nitrate of silver mixed with ammonia, then fixed with hyposulphite of soda, and washed repeatedly in water, will fade upon exposure to the atmosphere. About this there can be no doubt. I cer-

tainly can assert with equal confidence to Mr. Hunt, that I have taken every pains as regards the washing of photographs prepared upon ammonia-nitrate of silver with salt. I have used boiling distilled water in addition to common water, and yet, with all those precautions, as a rule, photographs so treated fade. I probably need not waste any more words upon this, because I think we must all agree that we have yet much to learn as regards the conditions necessary for the permanence of photographs. At the same time I must not be misunderstood. It is equally true that prints prepared in the manner I have indicated by Mr. Henneman for Mr. Fox Talbot having only three changes of common water, are now as fresh and brilliant as at the time when they were first issued. In the library of the London Institution there is a copy of the 'Pencil of Nature' which I have carefully examined, and which will bear me out in this statement. Nor does the permanence of the ammonia depend upon color merely, because we find pictures, issued in 1844, of different tints. We are still, therefore, in the dark as regards the exact conditions required for the permanence of photographs. I have before me an example which bears upon the point. Here are three pictures which were made in 1848 from negatives taken by Mr. Storey Maskelyne of Oxford, printed with special care upon the salted paper with ammonio-nitrate of silver. They were placed in a desk in a room in which gas was burnt, a small room with an impure atmosphere, in which a daguerreotype or a piece of silver would soon be blackened. These pictures were examined by me in 1853, and I marked upon them at the time, very pale, but all details visible. They had changed from a sepia to a purple tint, but where still very fair representatives of photographs. I saw them again within these last twelve months, and I found that the whole of the characteristic color of the photograph had disappeared, all the essential details being still visible, but represented by a faint brownish or greyish-brown color. This is the appearance of the uppermost photograph. Now, what is the condition of the picture immediately beneath it? It still retains the characteristic appearance of a photograph, although it has become lighter. The contrast is very great between these two: the lower one is somewhat of a darker brown than the top one, which was most exposed, but it has lost that characteristic color which all three had at the time of printing; it is only the centre one that retains at all its characteristic appearance. Knowing the care with which these were prepared, I say confidently that Mr. Hunt must reconsider his opinion.

Mr. Hardwich's paper suggested to me several remarks, but before I go further I would observe, that we must all feel exceedingly grateful to that gentleman for the thorough manner in which he has investigated this subject. I am not saying too much when I assert, that until Mr. Hardwhich commenced his researches, the subject of positive printing was not taken up in that thorough philosophical spirit which it deserved. In the main my views coincide with his. There are one or two points to which, perhaps, it will not be amiss to direct the attention of the Meeting. First, with regard to the action of sulphur. It must be admitted as an unquestionable fact, that the ordinary photograph may be changed from its brown color to a purple, or slate-color approaching black, by the action of sulphur; but it does not follow that therefore it is in a condition to fade. Here is a copy of a negative taken by M. Martens of Paris, several years since; it was changed by the action of the old hyposulphite-bath, and not the slightest detail has disappeared, although it was prepared several years since, and has been kept in an ordinay portfolio. I have by me some older specimens of Mr. Fox Talbot's, which received a purple tint by allowing a small quantity of hyposulphite of soda to remain after the last washing, and then, while the picture was slightly damp, passing a hot iron over its surface. In 1844 I first used this method of deepening the color, and I find that pictures prepared in this manner have retained their perfection and details for several years. So far, therefore, as we can speak with any confidence it this matter, the fact of pictures thus changed by the action of hyposulphite of soda and heat remaining good, warrants the assertion that the mere presence of sulphur is not sufficient to account for the fading.

There still remain some conditions to be ascertained before we can be prepared to say whether we should discard sulphur or not; I am of opinion that we can use it as a coloring agent, and it is no doubt much cheaper than gold. But there is one difficulty that we must all feel lies at the root of the inquiry, and that is as to what is the nature of the image with which we are dealing. Different opinions have been expressed by men who are eminent for their chemical knowledge. During the last few years I have had an opportunity of asking most of our great chemists as to the probable nature of the change which the photographs undergoes. It has been stated that light produces from chloride of silver, metallic silver, oxide of silver, suboxide of silver, and subchloride of silver. Those are the opinions of men who carry with them some weight, from Liebig downwards. In this state of the question, it becomes us as photographers to be very cautions how we take up any particular view in this matter. My own view is, that up to the present moment we have no evidence to warrant us in stating whether the image is metallic silver, or oxide of silver, or a compound of silver with organic matter. The experiment I made in the early part of last year, which led me to the *opinion* that the photographic image is of an organic nature, was as follows: I mixed a small quantity of animal fluid with a weak solution of nitrate of silver; this was left in the light, a precipitate was produced in the liquid, which under, the action of the light, darkened to a sort of mulberry-red. One could not help being struck with the fact that the color of the substance was apparently identical with the color produced by the photograph. Finding by experiment that certain animal fluids cause a precipitate in the nitrate of silver, and that the precipitate will darken to a substance resembling a photograph, it would not be a very wild analogy to suppose that the photograph itself might be the silver combined in some way with the animal matter. I have made an experiment with a view of throwing additional light upon the subject. I have taken some common water, and mixed with it a certain quantity of nitrate of silver: I have taken a similar portion of the same water and have mixed with it two or three drops of animal fluid and the same quantity of nitrate of silver; the conditions were otherwise the same in both. The mixtures were exposed to the light for some hours, and where nitrate of silver was mixed with common water, very little darkening took place, but where liquid animal matter was added to the water and nitrate of silver, a considerable quantity of precipitate was found, with very much the characteristic color of the photograph. I made another experiment with a less quantity of water, and I found that with animal matter I got a precipitate varying from brown, which is the characteristic of the photograph, to nearly black; I think, therefore, there can be no question as regards the direct influence of animal matter upon the production of the color or tint in the photograph; but it does not at all prove, as a consequence, that there is any combination of the silver with the organic matter under the action of light. I made another experiment by adding nitrate of silver to albumen, and I obtained a white precipitate at first, which upon shaking it with a larger quantity af the white of egg, disappeared, so that it would appear from this, that the substance which is precipitated is soluble in an excess of the animal matter. This solution darkened in the light, and it may be that the silver so dissolved in the animal matter is, when exposed to the light, separated from the animal matter, but in very fine state of division. It may be again, that in the color we have silver merely precipitated, and that the difference in tint may arise from the degree of fineness of the precipitate, and the manner in which it is aggregated together and entangled in the animal matter about it; these special conditions, more or less preserving it from the action of certain re-agents. I think it cannot be denied that these are fair suggestions to make in the absence of any direct proof, of the composition and nature of this substance which constitutes the image.

It is quite fair to insist upon chemical proof, as to whether the image is a compound of silver with animal matter, or whether it is silver merely diffused throughout the animal matter. Nothing short of the production of the coloring substance in a condition fit for rigid analysis will satisfy me. It has been said, that if the image consists of metallic silver, metallic mercury should

unite with the image: I do not think that that is a perfectly tenable position. We know how the physical condition of a substance affects its behavior, and that this silver may be in such a condition as regards fineness, that it may in one sense resemble mercury itself; which when chemically precipitated, is in so fine a state of division as to lose its lustre and the power of readily uniting. It has been found, that in attempting to make a copy of a daguerreotype by means of the electrotype process, if you place the plate into the voltaic cell, and precipitate copper upon it, you find it impossible to seperate the piece of copper from the silver. But if you leave the plate exposed to the atmosphere for a few hours only before depositing the copper upon it, you can afterwards without any difficulty separate the copper entirely from the silver plate. It is with me a question whether this silver of the image may not be in the condition of a plate of glass, which, when covered with very fine particles of dust or other matter, will allow water to run off its surface without wetting it.

I think these remarks are fairly applicable to the question before us; at all events I trust they may have the effect of teaching us caution in coming to any conclusion at present, as regards the nature of this image. There has been too great a tendency to dogmatise upon this part of the inquiry, and those who have paid most attention to the subject will, I think, agree with me that we must admit that we know nothing as yet of the substance which produces the photographic image, and that we consequently know nothing of the conditions for preserving it. Therefore it is that I deprecate the use that has been made of our journal as to statements of certain processes being "infalliable," "improving by time," &c. What! when we have pictures before us that have existed five or six years before showing any palpable signs of fading, can it be said of any process recently invented, that the results will improve by time? We must wait for many years to prove such an assertion. So with regard to gold, I entered my protest against its being considered a desirable fixing agent. I do not deny that gold assists in making the shadows more permanent, but I maintain that it is not deposited in sufficient quantity to preserve the half-tints, and a picture which has lost its half-tints is no picture as we understand photography at the present time.

Is there then no remedy for this state of things? It appears to me that our best course will be to prepare our pictures by processes somewhat similar to that adopted in the 'Pencil of Nature' by Mr. Fox Talbot, or on paper moderately albuminized. I prefer the last, and I do not agree in the opinion that albuminized prints are "vulgar." I think those remarks are more calculated to serve the individual ends of the assertor than to forward the true interests of photogrophy. Would any one assert, as regards the fine pictures in our National Gallery, that because it has been found necessary to varnish them, they have been vulgarly treated, and that the process was one that ought not to be adopted? We must have recourse to all such means, however troublesome, as are necessary to render faithfully the negative, and preserve unchanged its counterpart, the positive. Mr. Hardwich has shown us that albuminized prints stand very well against certain of the destructive agents, but we do not know that any photograph will in the end stand against them. It is true that pictures prepared by means of gallic acid appear, at first sight, to be permanent; but here, again, I think there are mistaken views abroad. In one of the public libraries a book was deposited as a specimen of the art: it contained a negative, with a copy of that negative and several other positives. On first opening the book, the negative was found to be in an advanced state of fading. This must strike one as worthy of note, and I think it is not an uncommon case. I fully admit that negatives, as compared with positives, are more permanent: but we must not run away with the idea that therefore we can print copies by the negative process and then expose them with impunity for months to the open air, as we see done in the shop-windows in London; a proceeding which I cannot designate otherwise than as one of utter folly. A work issued lately was printed by the negative process, and amongst the prints are some from collodion negatives, which one would hardly dream had been so taken. They are poor cold results, coarse in texture, and deficient in delicacy of gradation of tint in the lights and shadows, as compared with prints upon either common or albuminized paper. We still have to invent a good "development" printing process.

Then comes the question:—If pictures developed by the negative process may be more permanent than those on albuminized paper, why not use it? I reply, first, because it gives an inferior result, and, next, because the question of permanence is only one of degree. Knowing, moreover, that pictures printed upon albuminized paper, and even upon ordinary paper, have remained permanent for many years, I am of opinion that we should continue to carry out such process, shielding the positives so printed from those conditions, which experiments point out as chiefly interfering with their permanence. Could anything be simpler, by way of precaution, than to fold them in some material impervious to the atmosphere, and then to place them in a tin case, as an additional security? We may safely admit that they are not equal to engravings in permanence, but perhaps more closely resemble water-color drawings; and therefore they should be placed under glass or in a portfolio so as to exclude the atmosphere and its impurities from free access to them.

Mr. Fenton.—I have brought with me a few negatives which have been for some time during the past year lying in the Glass House of the British Museum, without any fire in the room, and exposed to the heat of the daytime and to the damp of the evening. All of them, except such as were varnished, exhibit symptoms of decomposition. The change has generally begun at the edges, in the usual way, proceeding, gradually from the edges to the centre. I have pictures here in all stages of decomposition; one of them, as you will see, having entirly faded. The half-tone has become yellow, and what was formely a brilliant black has faded into a dirty brown. I have not been able to detect any traces of crystallization. I was not at one time aware that negatives would fade, but I had a conversation with Mr. Niepce, in which he expressed his belief that every negative would in proper lapse of time disappear. The duration of works of art is of course a comparative matter. We should not, for instance, expect a manuscript to last as long as a bronze statue. If water-colors were exposed to the same conditions as photographs are in some of the shop-windows, there would soon be no trace of them. I have heard one gentleman state that he does not believe that any water-color will after 100 years give the slightest idea of what it originally was. There are I believe in the galleries of the Louvre hundreds of pictures which are not very old, but which have completely fallen into tatters. I do not, with Mr. Malone, despair of at some time being able to give much greater permanency to our positive prints. I found some prints fade in half a day, whilst others, prepared perhaps on the next day, and in apparently the same way, have shown no change whatever. I know that the rapid fading is due to the acid state of the hyposulphite bath. I have never been able to obtain such beautiful prints as by the old hypo; nothing gives such good half-tones.

Although the albuminized paper is not suitable for all subjects, yet for many it is very much superior to any other method. The principle fault I find with pictures printed with gold, is that there seems to be a sort of deposit upon the surface, which obstructs all the details of the shadows.

Mr. Malone.—Mr Fenton has quite misunderstood me. I said that at present we have no data for stating with certainty that pictures prepared according to our present method are secure; and simply for the reason, that, not knowing the nature of the image, we cannot discuss the exact influence of atmosphere and moisture. When we have explained those points, no doubt we shall be able to make all our pictures as permanent as those in the 'Pencil of Nature.'

Mr. Hardwich.—With regard to Mr. Malone's observations on the composition of the image, I think what he has said is very excellent; but I conceive that I have sufficient proof to enable me to state what is the composition of the photographic image. I will at a future meeting, make the subject as clear as I can. I have so many arguments, all tending to the same object, that I think the matter may be clearly proved.

Mr. Malone has said that prints toued by sulphur are not necessarily iu a condition to fade: my views upon that subject are stated iu the last paper. I think that a *very slight* amount of sulphuration does not, practically, do a print much injury: but if the process is carried to the maximum of darkening, then the print will fade ou exposure to damp.

With reference to the faded negatives exhibited by Mr. Fenton he states that gas was not burnt in the room in which they were kept, otherwise I should have been disposed to suggest that as the cause of injury. Dr. Diamond has mentioued to me the importance of this poiut, aud I have made some experimeuts, which will be communicated to the Society. I collected one ounce and a half of water from the combustion of a jet of coal-gas, and found it acid from sulphuric acid.

Mr. Shadbolt.—Mr. Malone has made some remarks with regard to the process particularly advocated by Mr. Sutton as being iudelible. Oue of the peculiarities put forth as being evidence why the pictures produced by this process should be better than others, is that they improve by time: I think that is proving a great deal too much; if he proves that the pictures change at all he cannot prove that that may not be eveutually a destructive change. Mr. Malone throws it, I think, rather unjustly upon Mr. Sutton, that he has complained of the vulgar appearance of albuminized pictures. Mr. Sutton is not the only person who has doue so; I could plead guilty to having made the same remark.

As to the greater permanency of albumenized pictures over those on plain paper, the opiuion seems to be that they resist oxidation better, but not sulphurization. Mr. Malone also states that albumiuized pictures are better in their details than those on plain paper. Admitting that this is the case with some pictures, I must say that the finest photographs I have seen are those upon plain paper.

With regard to pictures produced by the negative process, there seems to have been a vague notion that they are more permanent than others: this is sometimes the case, but uot generally speaking.

We can scarcely institute a comparison between positive pictures and paintings. Never is the care bestowed upon their preservation that first-class paintings receive. They rather compete with fine engravings, or perhaps with water-color paintings.

If, in the remarks made by Mr. Fenton, he refers to the sel d'or as recommended by Mr. Suttou, I must differ with him on the point of its obstructing the details of the shadows: I cau speak in the most emphatic terms of the great advantage of the bath of sel d'or in deepeuing the shadows, provided the picture has uot been over-printed.

As a general rule, those pictures that have starch in their composition will more readily produce a cold tone than those which have size or any other description of animal matter.

Mr. Malone.—Perhaps, having opened the discussion, I have the privilege of making some observations iu reply to Mr. Shadbolt with regard to albumiuized priuts. I think that his remarks rather tend to increase the importance of my views upon that subject. In my opinion, as a rule, there can be no doubt that albuminized paper renders the pictures better thau plaiu paper, and that you may use a small quantity of albumeu with advantage. As regards their preservation, if these resist oxidation better thau the others, it is all in their favour; aud theu it comes back to the former question. I proposed on a former occasion that a lead compound should be used, such as we find on glazed cards, and with regard to acids, I know that it is the opinion of a great chemist that there is sulphuric acid in London atmosphere. I think all these things go to prove the advantage of printiug on albuminized paper; and certainly, all things show the importance of taking the precaution of enveloping the prints, as I suggest, in a tin case, or placing them under glass in some way to prevent the action of sulphur.

The Chairman.—The interesting analysis which Mr. Shadbolt has given of the discussion makes any remark from me unnecessary.

There is, however, one observation of Mr. Malone's I would just refer to. He says that the photographic image is of an organic nature; that is, that the silver does actually pass into a distinct combination with some organic portion of the paper; and it is interesting to know that in the very first photographic paper which was ever published upon this subject that opinion was maintained. Sir Humphry Davy distinctly stated in his first paper upon the Chemistry of Photography, that the picture is formed by an organic combination with the silver; and he hoped, as a means of fixing the picture, to be able to discover some chemical compound which would destroy that portion of the combination which had not been acted upon by light; he promised to communicate his discoveries to the world, but unfortunately no further announcement was made by him of those researches. This militates very strongly agaiust the fact of the picture being formed simply of pure silver. I am not quite sure that Mr. Malone did not attempt to uphold both statements. Perhaps Mr. Malone will allow me to say, that I should be glad to know how he reconciles what appears to me to be the only important discrepancy in the valuable observations we have heard from him.

Mr. Malone.—It was my wish to show that it is perfectly easy at the present stage of the investigation to argue in either direction; and although I brought forward an experiment which shows the influence of organic matter upon the variations of color in the photograph, I still left it an open question, whether the color is due to metallic silver precipitated upon the solution and involved in the same organic matter, or whether it is a combination. We know nothing at all at present about the image with certainty. I must, in justice to Mr. Hardwich, say, as he tells us that he is confident he can unfold to us the nature of the image, that as my remarks were made prior to this statement, they were so far true.

Mr. Hardwich.—No doubt.

Mr. Hardwich read a paper "On the Photographic Properties of the Citrate of Silver."

The thanks of the Meeting were voted to Mr. Hardwich for his interesting communication.

Mr. Frederick Easr exhibited an improved camera, of which a description was read.

Mr. Mawson of Newcastle exhibited his Patent Portable Camera.

Mr. Ottewill explained the advantages of his Portable Dark Chamber for holding and changing excited collodion plates.

The Secretary.—I have received a letter from Dr. Percy, in which he states, "There is one chemical fact which may turn out to be of some importance in a scientific point of view, and which I should be glad to mention to the Society through you. It may probably have been observed by many, and have been publicly recorded. It is, however, new to me. Some months ago, having occasion to make some chloride of silver by exposing silver leaf to chlorine gas, I was surprised to find that the chloride of silver so produced underwent no darkening whatever in light, even when fully exposed to sunshine. I have kept a specimen some months fully exposed to light *in common air*, and yet no darkening whatever has taken place. Perhaps some of the members may be able to communicate other facts which bear on the subject.

Nitric Ether.—This compound may be prepared by mixing equal weights of alcohol and strong, fuming nitrous, or nitric acid in a glass retort. Great care is necessary; the alcohol must first be put into the retort, and the acid added by drops, at long intervals, by means of a funnel resting upon the bottom, the body of the retort at the same time being under ice water. Even with the utmost care, the reaction is extremely violent. When first distilled, nitric ether contains a small quantity of acid, which may be removed by potash or lime, and a second distillation. It has a yellowish color, and an odor of apples, and a strong taste. Diluted with water, ten drops to the ounce, and mixed with rottenstone, it is excellent for cleaning daguerreotype plate.

PRACTICAL TREATISE
On the Employment of Commercial Papers in Photography.*

BY STEPHEN GEOFFRAY.

Translated from the French for the Photographic and Fine Art Journal.

PROCESS FOR PURIFYING PAPERS FROM METALLIC SPOTS AND FATTY SUBSTANCES.

§56. We have pointed out, among the vexatious consequences of the common mode of manufacturing and preparing papers, spots of rust, spots of pure metal, metallic greasiness, and even greasiness from touching. The papers should be cleaned of all this soiling; and this precaution should evidently precede the sizing by the coatings intended to render the action of the reacting sensitizer more regular and more powerful. You should therefore take all the suspected sheets, after they have been bought, chosen, and classed, in the manner that has been indicated, and treat them thus, namely:

§57. Dissolve 20 grammes citric acid, that is transparent, or even white,† in 200 grammes of distilled water. Pour the solution into a china or porcelain basin;‡ immerse in it for an hour or two, some ten sheets together; take them out and bathe them in another basin, containing water rendered alkaline by 5·0 of ammonia; then wash them in pure water. Take them out and suspend them by a corner, and dry them away from the dust.§

Proofs obtained afterwards, upon these papers, will be exempt from spots, which too often tarnish negatives that are otherwise well done, and free from those black points which frequently destroy the most beautiful positive images, and make useless impressions that otherwise are perfectly successful.

COMPOSITION OF AMELIORATING COATINGS.

§58. What we have said upon the composition, manufacture, sizing, and the final preparations of the papers of commerce, explains sufficiently the necessity of coating the papers intended for photographic work, with different and preliminary preparations.||

I give below many normal formulas which can be modified, the two first especially, either in the proportion or in the number of their elements; or they may be combined together when employed, according to the object and the experience of the operator.

§59. Firstly; Into a vase of glass or enamelled earthenware, containing 200 grammes of distilled water;¶ introduce 25 grammes of soluble amidon, and 15 grammes of ordinary sugar; boil it until it is completely liquid, then cool and filter it.

§60. Or better: into 200 grm. of distilled water, introduce 25 grm. of the iodide of soluble amidon,** and 10 grammes of sugar; boil, cool, and filter.

§61. Or again: in 100 grm. of distilled water mingle when cool 100 grm. of Dr. Quesneville's syrup of iodide of amidon, and filter it.

§62. Secondly, In a vase containing 200 grammes of distilled water, dissolve 30 grm. sugar of milk, *modified*.

§63. Again: beat together 200 gr. of distilled water and the white of four eggs; let it stand some hours, and then pour it off.

§64. Mingle together the three solutions, and filter with care. Liquor so prepared should be preserved in bottles well corked. It will be useful as long as it lasts.

§65. Dissolve, hot or cold, 100 grm. sugar of milk, *modified*, in 100 grm. of distilled water, Filter the solution with care when you see it complete, and preserve it in bottles well corked.

§66. It may be advantageous, in certain cases, to have a sizing highly charged; then if we employ the powder of iodide of soluble amidon, or the syrup of iodide of soluble amidon in strong proportion,†† it is well to replace the albumen by gelatine, as more pliant; this last body supports the presence of iodide more easily without coagulating. If this last is done, it will be necessary to hold its bath by a gentle fire during the impregnation of the papers.‡‡

§67. The complete solution of the iodide of amidon can be aided by subcarbonate of soda in the place of the sugar. This composition is favorable to the solution of albumen.

§68. It will not be disadvantageous to replace the distilled water used as a vehicle, in this and the preceding formulas, by serum in the same proportions. The *conservative* properties of this body will add to the qualities of the two coatings.

§69. Take 5 grammes of gun-cotton, dissolve them in 100 grammes of alcohol at 36°, and of ether at 60°, and employ this collodion, very freely, in a bath more or less abundant.

§70. Take, in sufficient quantity to make an abundant bath, some rectified oil of coal; you can employ this substance advantageously, without any addition. Avoid exposing it too long to the light, if you keep it beforehand.§§

EMPLOYMENT OF AMELIORATING COATINGS.

§71. When you have examined your paper, by looking through it, to see if you have chosen a texture regular as possible, and when you have tried it chemically, you should try next whether it is more proper to receive positive or negative images; next, its transparency and the purity of its paste, the nature of its sizing, and the kind of its tissue. Then you must ameliorate it according to your needs and its state.

§72. I have already advised that every paper should be subjected to citric acid. This will, if done with discernment, neutralize all excess of acids or alkalies that may be in it.

§73. The baths indicated in §58 to §63, are destined for papers insufficiently sized, of strong grain, irregular texture,—all ordinary papers in fact.

§74. Iodide or chloride employed as a sensitizing coating, gives positives of great beauty.

§75. The sheets that we would ameliorate should be plunged in it, one by one, and remain immersed three or four minutes, then be hung up and dried freely. As a sensitizing coating for positives, the paper should be coated on one side only. This new

* Continued from page 115, Vol. IX. No. IV.

† Some persons advise for purging papers of these impurities, either chloridic acid, 10 per 100, or oxalic acid, 5 per 200; but the process is liable to accidents more vexatious than the evil to be cured. Chloridic acid takes all tenacity from the paper, so that when it is put into the baths, which ought to follow immediately, it comes apart. It cannot be so neutralized as not to act afterwards upon the proof, so that it is soon spoiled. Oxalic acid, even the bioxalate of potassium, has fatal consequences; it is an energetic *reducer;* proofs, under its influence, very soon become spotted; the oxalate of chalk which it forms out of the paste of the paper, is as much of a reducer as the acetate of chalk, and consequently produces a general reduction, which renders the image impossible; or it reduces in spots, which is perhaps worse.

‡ The bath should be very large. The papers ought to swim in it. For a prompt reaction it is desirable that the liquid should be kept lukewarm.

§ Too great precaution cannot be taken against dust. Those who have not operated upon albumen or collodion do not know all the consequences particles of dust produce. Of all spots, those produced by dust are the most irremediable.

|| In fine, we can see that if the paper, before receiving the sensitive film, is not completely ameliorated, so as to fulfil all the conditions of a paper photographically perfect, the sensitive coat penetrating it will have the same defects; the capillary attraction of its interstices, the irregularity of its grains, the influence of the reactives it may contain, the force of the reduction which is proper to it, &c., &c. On the one hand the coatings will *mould* the paper, if I may say so, in repeating the form; on the other hand the sensitive substances will be in immediate contact with the very matter of the paper.

¶ If I have not water distilled by myself, I take rain water collected with care. I do not employ the distilled water of commerce except at the last extremity; for it is often impregnated with fatty substances, or metallic bodies, if it has been prepared from steam engines. When it is prepared by apothecaries, it is apt to be charged with all kinds of aromas, &c.

** Doctor de Viry advised me to use Dr. Quesneville's soluble amidons in photography. These bodies, which can be found everywhere very well prepared, are I am sure, of great service in preparing photographic papers.

†† Iodine is an energetic coagulater of albumen.

‡‡ Gelatine if boiled long, is rendered incapable of being frozen, however concentrated may be its solution.

§§ Every layer not soluble in the baths which are used to iodize the paper, can be of a more or less advantageous effect for preliminary amelioration of the latter. Inuline, insoluble in cold and soluble in warm water; glycerine, which is precipitated by the feeblest acids; gelatine very little soluble cold, and precipitated by gallic acid; mucilage of many vegetables, solutions in alcohol, or ether, or benzone, of many vegetable and animal substances, can all be employed successfully for the supplementary sizing of papers.

sizing has also the qualities pointed out in §§ 31, 32, 33, 34. It gives besides to proofs shades of great intensity and richness of outline; the image has always the appearance of having been produced without difficulty. It produces all its effects when the sensitizing coatings have for a solvent either alcohol or benzine, or the essence of tiribenthene, all of which coagulate albumen; for it is to this coagulation that the sizing of which we speak owes its greatest value.

§76. If the papers are very well sized already, if besides their paste is homogeneous, if they are of regular grain and texture, it is well to coat them with the preparation of sugar of milk, *modified*. They will gain by this impregnation of their fibres the precious quality of preserving dry their sensibility much longer, and of giving a very pure image, with beautiful shades and fine lights.

As this coating is very soluble in water, it is of use especially with iodurated baths not watery. Baths of sugar of milk, *modified*, have also the advantage of neutralizing by citric acid the effects produced by chalk that may be in the paper.

§77. Papers, found in pretty good condition, will still gain great advantages in being immersed in baths of the oil of coal.

§78. This operation can be repeated two or three times, to render the paper perfectly impermeable; then it is capable of receiving a bed of photogenic collodion, and so of producing very beautiful negatives.

The preparations of albumen find in it the same advantage as in the employment of waxed paper; they can furnish an excellent dry paper.

§79. Positive proofs, obtained on the surface of papers impregnated with oil of coal, then covered with some kind of coating, are remarkable for the vigor and freshness of their tints. These papers are otherwise not proper to give proofs in the depth of their paste; for employed to this end, they are of a too great slowness.*

§80. We have had occasion to recall the influence of the air to reduce sensitizing coatings. It is in consequence of this influence, combined with the action of the *cellulose* and spirits, that collodion upon ordinary paper, and even upon paper sized with resin, is so uncertain; this is why also that albumen which is preserved in a sensitive dry state upon glass for many days, cannot be preserved upon paper. This inconvenience of the papers absobing air can be obviated, by covering the side which is to receive the sensitizing coating, with a bed of collodion; to do it, I extend the paper to be modified upon glass, sizing it on the borders; I then spread the collodion as upon glass, and leave it to dry; then I coat it with albumen, no matter by what method. The drying should always be in the open air.

§81. I sometimes successfully pass my paper through the oil of coal preliminary to extending it upon the glass.

§82. It is very important to dry perfectly the sheets passed through ameliorating baths, before coating them with the sensitizing preparations.

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§83. Must I explain why I distinguish the sensitizing coats from the ameliorating coat; and why I advise the employment of the one before the other? To wish to produce the same result by a single operation, is, even in the case when that seems possible, to turn in a vicious circle, as we say.

§84. We have, latterly, inverted the method of application of the coats in the use of them; so we have begun to coat papers with fat substances, and those which crack under the action of water, afterwards covering the paper so prepared with some kind of mucilage, without observing that in every case, by this manner of making the coatings succeed each other, we must destroy the effect of the first, by the application of the second. Waxed paper, whether waxed with terebinth or bensine, passed afterwards in a bath of iodized water, which must penetrate it mechanically, is found to be brought back, as to the grain, to a state much more vexatious than before any preparation. The wax then can have only one advantage, that of embellishing the fibres so as to preserve the sensitive paper dry. On the contrary, it gives to proofs a granulated appearance which becomes their normal defect. The fineness of detail does not exist with the latter except by chance. Moreover their *sensitization* is rarely regular.

BLOTTING PAPERS.

§85. We have been occupied hitherto, especially in the preceding chapters, with papers before they have received photographic images, either on their surface or in the interior of their sizing. It remains to speak of unsized papers, whose use in photography is of the greatest importance.

§86. But unsized papers, even those destined for the printing office,† are not generally so carefully made; their elements are less pure, they are not chosen so carefully; metallic spots abound in them.

These papers are generally made of greasy rags, requiring for their bleaching very rich chlorides,‡ strong alkaline washes;§ the use of carbonate of chalk, of alumina‖ and sulphuric acid.¶ We can judge by this single observation, of the consequences that attend the use of such papers, which yield so readily the reactions which they contain.**

§87. These papers serve to absorb the moisture of the sensitized sheets. Their contact with them is favoured by a strong pressure, and friction more or less rapid; so we see that aided by the humid condition of the two surfaces in juxtaposition, the constituent element of the two papers can easily, if there is any affinity between them, react upon each other.

§88. Some persons advise the employment of colored blotting papers, red or blue. It is an imprudent advice; the manufacture of papers differ extremely†† in different establishments, and in the same establishment on different days; sometimes the colors are stable, sometimes evanescent; I have thus had a great many careful sensitized sheets completely ruined. Besides, if the colour is well fixed, it can produce a reaction, in contact with the salts of Silver; hence spots which are irremediable. The blue must be Prussian blue (cyanhydrate of iron), or indigo precipitated from its sulphate by chalk, or cobalt (oxide of cobalt) or ultra marine, etc., etc.

§89. As to the reds, they are almost always salts of iron, either pure or as ochres. Sometimes, but rarely, they come from vegetables, as Brazil wood or madder.

This incomplete nomenclature of the elements which complicate the composition of coloured blotting papers, will suffice, I think, to frighten all who use them.‡‡

GELATINOUS PAPERS.

§90. There is in commerce a product, which, considered in the photographic point of view, would have, if well employed, all the advantages both of paper and of glass. This product is called gelatinous paper. It is used a great deal for lithographic impressions. We use it in photography under the name of *papier glace*, to preserve, by its interposition, the negatives against the sensitized paper for the production of positives.

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* Therefore I no longer employ with iodides the oil of coal as a sensitizing coat.

† I use printer's blotting paper which is more carefully composed and manufactured, than that used by writers of manuscript.

‡ Chemistry will give the means of detecting the chloride in these papers. See §52.

§ Chlorine also makes veritable combinations with colouring matters, and these are often soluble in alkali; hence the employment of alkaline baths, for washings after the employment of chlorides.

‖ See §48 for what we have said of alum. Alumina is often employed pure; but it finds in paper elements for many combinations.

¶ This acid combines rapidly in paper where it almost invariably finds a base. We have already spoken of the numerous inconveniences of this body even in a combined state.

** I am so convinced of the numerous bad influences of blotting papers, that I try in every way to do without them. I often use a glass *stick* to take away the excess of moisture from my sensitized sheets, and dry them as much as possible, finishing the drying away from the air in a bottle under the influence of a gentle heat.

†† Even one half of a sheet will differ from the other in many cases; even when the papers are beautiful.

‡‡ The best means of avoiding the deposit of silver crystals upon the surface of papers, is, after they are dry, to scour the sensitized sheets with a badger brush, and to agitate them a second; or afterwards to rub them lightly with a pellet of Joseph paper. If the paper should be used moist, the crystals will disappear by the least washing with distilled water.

This body is perfectly translucid, its sheets are smooth, of an absolute continuity, without any texture; they can take different tints without losing their transparency.*

Unhappily their easy solution or their contraction in liquids, has hitherto turned photographists from attempting their application to photography. I believe, however, that it would be wrong to abandon this product, remarkable in so many respects. I think I shall myself soon arrive at some practical result by experiments in it. Meanwhile, I would indicate it as an object of investigation to others.

(*To be Continued.*

* The persistance of its tints after the completion of the negative, makes it of great advantage for obtaining positives. Need I recall the influence of the colouring of mediums upon luminous rays for the chemical results of the latter. Who has not seen that it is the effect of the interposition of a glazed violet paper, between a negative and a prepared paper, to give much more quickly a very beautiful positive.

From the Jour. of the Phot. Soc.

THE CAMERA CHORA.

The camera now before the Society has been in almost constant use for the last two years. It is made for pictures up to the half-plate size, and measures only 11 in. × 8 in. Within this small compass is contained all that can possibly be required for a full day's work in the open air, allowing the operator to take 6 dozen views in that time.

The following is a list of its contents:—

1 A full size tripod stand, which makes its appearance on turning one of the knobs. It is erected in less time than the portable stands now in use.
2. The exciting bath for plates up to the half-plate size.
3. A spare bath, in case of accidents.
4. Iodized collodion for 6 dozen plates.
5. Developing fluid for 12 dozen plates.
6 Fixing solution for 12 dozen plates.
7. Transparent varnish for 6 dozen views.
8. Gutta percha bath for washing the pictures.
9. Gutta percha tray with 3 dozen grooves for draining the pictures.
10. Drying stove (this will dry the pictures faster than they can be produced).
11. 6 dozen glass plates 4 × 3, or 3 dozen half-plate size.
12. ½ dozen glass tubes 6 in. containing crystallized nitrate of silver in reserve for the bath, Tripoli solution for cleaning old plates, prepared colors, camel's-hair brushes, test papers, liquid glue, Canada balsam, &c., and a graduated sand tube from 1 to 4 minutes for sensitizing the plate.
13. Large skin wash-leather, two towels, and silk rubber.
14. Diamond, rule, cutting cloth and spirit lamp.

The above are so arranged that every article may be taken out, the stand erected, the camera ready for work, and the whole repacked in less than five minutes.

This camera has nothing cumbersome about it: its appearance is such that a lady in a country ramble would feel no repugnance in carrying it from one point of view to another.

Besides all the advantages of a tent or dark chamber, it allows a full view and a complete command of the plate through all its changes, even in the bath the process of exciting may be seen, and the plate taken in and out at pleasure without injury.

To ladies, perhaps, the great attraction of this apparatus, besides its neatness and portability, is the *modus operandi*; the operations being performed by means of brass or ivory knobs attached to the outside of the camera, thereby preventing the possibility of staining the fingers or of spoiling the dress of the operator with the solutions.

The lens also is mounted on a new principle; it works in a ball and socket, and like the pupil of the eye has a range in all directions; the glass plate has a corresponding movement where it is necessary.

Within the brass mounting and between the lenses are eight moveable valves to regulate the admission of light upon the sensitive plate; four of these are colored white, blue, red and orange; three are diaphragms of various apertures, and one is a cap-valve, used when a very short exposure is required, as it may be opened and closed in an instant.

FREDRERICK FAST.

[This may be called a "*fast*" camera.—ED. P. & F. A. J.]

From the Revue Photographique.

METHOD OF REPRODUCING
Photographic Images on Paper, Stone, or Metal, without Salts of Silver.

BY MM. EMILE ROUSSEAU & MASSON.

1. *Method of obtaining Positives on Paper.*

This is based on the action that light excercises on salts of chromic acid in contact with eertain organic substances, and on subsequent chemical actions, designed to fix the image and to give it different colors and the desired intensity; by substituting for other salts the bichromate of ammonia dissolved in a saturated solution in cold distilled water. The coat must be either white gelatine dissolved in warm water, in the proportion of 10 to 100 of water, or gum-arabic dissolved in cold water in proportion of 15 to 100. To operate, spread the paper with a surface of dissolved gum, either by placing the liquid in a dish and slipping the leaf over its surface, or by a brush. When this is dry, spread the paper afresh with the mixture of 2 parts (in volume) of a saturated solution of bichromate and one part of gum, to which add for each 10 to 15 grammes of mixture (each 2½ to 4 fluid drachms) 5 or 6 drops of a solution of 10 grammes of sugar of milk in 100 grammes of water. This being dry, apply a third coat like the second, which being well spread, in the dark, the operation is now finished. It preserves its properties a long time, if it be well protected from light and kept very cold. When used, it must be gently breathed on to make it a little damp; put it under the negative in a frame, and expose it to the light. When this is judged sufficient, remove the paper, which bears an image of a strong brownish-red color, put it in a basin full of water or under a spout; wash till the water has no tinge of yellow and the whites are perfectly clear,

The effect of the water is to remove that part of the surface which has not undergone the influence of light, leaving untouched the part impressed. In twenty minutes or half an hour, only the image remains, of a redish-yellow color, very feeble and changed. To fix, put it at the bottom of a basin and pour over it a solution of 2 grammes (31 grains) of gallic acid and 2 grammes of pyrogallic acid in 100 grammes (3½ fluid ounces) of water, adding 5 grammes (75 mimims) of concentrated acetic acid, or 10 grammes of ordinary acid; keep pouring till the color deepens, which will be in about a minute; then stop it by plunging the proof into water, and wash until the excess of acid is removed. It is now fixed, but wants strength and blackness. To get this, put it again in a basin, and pour quickly over it a neutral mixture of nitrate of copper (10 of salt to 100 of water); then wash once or twice: this removes the gallic acid which would otherwise rest on the whites. Then cover it entirely with a solution (20 per cent.) of citrate of peroxide of iron: when it seems to have reached the desired point, pour on it with care a weak solution of protosulphate of iron (5 to the 100), which gives strength to the blacks, leaving the whites untouched, if only the citrate of iron is always somewhat more in excess than the sulphate. When the desired intensity is obtained, wash the proof with great care, repass it in the mixture of gallic and pyrogallic acids, and end by a plentiful washing.

To give a blue color, instead of the gallic and pyrogallic acids pour on the surface a very weak solution of salt of iron, wash and re-coat with an equally weak solution of yellowish prussiate of potash; this forms prussian blue.

If we substitute salt of copper or iron, we get a deep chesnut-color; if instead of salt of iron we use acetate of lead, a yellow;

if to this yellow we add salt of iron, we get with the prussiate of potash a green.

But to obtain good colors, the organic matter of the coat must have sufficient thickness.

2. *Photolithography.*

Spread the lithographic stone with a coat of a less consentrated solution of gelatine or gum; apply successively two coats of a mixture of bichromate of ammonia and gelatine, as before. This being dry, cover the stone with the negative, and expose to light; after the desired impression is produced, wash the stone quickly by allowing a jet of water to run on one of its ends, until all the bichromate not impressed is removed, which takes place in a few minutes; spread on the surface of the stone the solution of gallic and pyrogallic acids with 2 or4 drops (not more) of acetic acid, so as not to disengage the carbonic acid; wash two or three times, then spread a filtered solution of white soap; leave this on for two or three minutes; it is decomposed by the action of the acids fixing in the design, and it forms a thick acid which remains on the marks of the image; to increase this action and strengthen the relief a little, after washing, spread a solution either of nitrate of copper or acetate of lead; wash again, and again, pass over it the soap-water; wash well for the last time, until there is a complete removal of the coat of organic matter deposited on the whites. The image then isin high relief, hard and firm, but thick. Leave it to dry; then ink and take the proof in the usual way.

3. *Photographic Engraving on Metal.*

On a plate of steel, smoothed for engraving, spread a coat of gelatine; then, when dry, two coats of the solution of bichromate and gelatine; expose to the light; remove by washing the bichromate not affected; apply quickly the solution of gallic acid, and wash again quickly; leave it to dry; then edge the plate with soft wax, so as to hold a coat of liquid; pour on the surface a weak solution of nitrate of copper, slightly acid; in a few seconds the design is covered with a uniform coat of copper, the rest of the plate remaining bare; as soon as this coat of copper has got sufficient thickness and is becoming less clear, remove the solution of copper and wash the plate. The design is then reproduced, bitten in on the steel.

For the Photographic & Fine Art Journal.

GLASS CLEANING.

Richmond, May 10, 1856.

H. H. Snelling,—*Dear Sir:* Only because of your willingness to publish anything, however trifling, for the benefit and improvement of Photography, and not because of any great importance I attach to the following little bit of experience, that I make bold to communicate it to you. It is a common practice among photographers in order to clean glasses, that have become stained from being in long contact with the stamped velvet in the cases and from other causes, to immerse them in water acidulated with nitric acid. What I have to say upon the subject is, that I have tried this plan to my utmost satisfaction, and find it will not remove stains of this character, but on the contrary, seems to fix them deeper and more indelibly than ever. This is probably caused, by the acid having a greater affinity for that portion of the glass which is stained, than it has for the higher polished surface somewhat on the principle of etching. I would recommend in place of this mode, hard rubbing with cotton, rouge, and alcohol, as we rub the daguerreotype plate. When this does not succeed, I then take such glasses for the backs of positive pictures, instead of a commoner one. If you think this not *too* trifling, accept it and print it, in part for the many little hints and valuable information I have received from your valuable (and, I am sorry to add, sometimes *over late*) Journal. I am, dear Sir, yours truly,

M. P. Simons.

From the Jour. of the Phot. Soc.

ON VARIOUS AGENCIES DESTRUCTIVE TO PHOTOGRAPHS.

BY T. F. HARDWICH.

Action of Chlorine upon Positive Prints.—Aqueous solution of chlorine destroys the photographic image, changing it first to a violet tint in the case of a simply fixed sun print, and subsequently obliterating it by conversion into white chloride of silver. The impression, although invisible, remains in the paper, and may be redeveloped in the form of yellow or brown sulphuret of silver, by action of sulphuretted hydrogen. It also becomes visible on exposure to light, and assumes considerable intensity if the paper be previously brushed with free nitrate of silver. Sulphate of iron produces no effect upon the invisible image of chloride of silver, but gallic or pyrogallic acid rendered alkaline by potash converts it into a black substance, as shown by Mr. Maxwell Lyte.

The action of chlorine water usually commences at the edges and corners of the print, in the same manner as that of oxidizing agents. The proofs upon albumen are, of all, the least readily injured, and next, those developed on iodide of silver.

Hydrochloric Acid.—The liquid acid of sp. gr. 1·16, even when free from chlorine, acts immediately upon the half-tones of a positive print, and destroys the full shadows in the course of a few hours; a slight residual colour, however, usually remains in the darkest parts. The prints developed on iodide of silver are the most permanent.

Sulphuric, Acetic Acids, &c.—Acids of all kinds appear to exert an injurious influence upon positive prints, and especially so upon the half-tones of the image, the effect varying with the strength of the acid and the degree of dilution with water. Even a vegetable acid like the acetic gradually darkens the color and destroys partially or entirely the faint outlines of the picture.

Bichloride of Mercury.—The most important particulars relating to the action of this test upon photographs are well known. The image is ultimately converted into a white powder, and hence, in the case of a positive print, it becomes invisible; immersion in ammonia or hyposulphite of soda, however, restores it in a form often resembling, in tint, the original impression. A point worthy of note is the protective effect of a deposit of gold, which is very marked, the " toned " proof resisting the action of the bichloride for comparatively a long time.

Ammonia.—The effect of ammonia upon a print is rather to *redden* the image than to destroy it; the half-tones become pale and faint, but they do not disappear. Toning with gold enables the proof to resist the action of the strongest solution of ammonia, as Mr. Shadbolt has lately shown, and hence ammonia may safely be employed as a fixing agent after the use of the sel d' or bath.

Hyposulphite of Soda.—A concentrated solution of hyposulphite of soda exercises a gradual solvent action upon the image of photographic prints, at the same time tending to communicate sulphur and to darken the color of the impression. A faint yellow outline of sulphuret of silver usually remains after the solution of the image is completed. Hence it is evident that the plan of over-printing positives, and subsequently reducing them by immersion in a strong solution of hyposulphite of soda, is not safe even with a new bath.

Developed prints of all kinds, but in particular, the Talbotype proofs upon iodide of silver, are less readily dissolved by hyposulphite of soda than those obtained by the direct action of light. There is also a slight difference between plain and albuminized prints, which is in favor of the former, the albuminized paper always loosing somewhat more by immersion in the hyposulphite bath than plain chloride paper sensitized by nitrate of silver.

Cyanide of Potassium.—The solvent action of cyanide of potassium is most energetic upon photographs formed upon paper. These images, whether developed or not, do not withstand the test so well as the impressions on collodion. Albuminized proofs have also invariably proved, in my experiments, to be

somewhat more easily affected than prints on simple chloride paper sensitized with nitrate or ammonio-nitrate of silver.

Heat, moist and dry.—Long-continued boiling in distilled water has a reddening action upon positive prints. The image becomes at length pale and faint, resembling a print treated with ammonia before toning. A deposit of gold upon the image lessens, but does not altogether neutralize the effect of the hot water. If the boiling be loug contiuued, the violet purple toue often imparted with gold invariably gives place to a chocolate brown, which appears to be the most permanent color. Prints developed by gallic acid upon paper prepared with serum of milk or with a citrate, suffer as much as others obtained by direct action of light. Ammonio-nitrate priuts on highly salted paper, which beeome uearly black wheu toned with gold, retain their original appearance the most perfectly; a slight diminution of brightness beiug the only observable difference after long boiling in water. Albumen proofs and prints on English papers, or foreign papers prepared with serum of milk, citrates, tartrates, or any of those bodies which *redden*, the reduced silver salts are, as a rule, rendered lighter in color, and pass from purple to brown when boiled in water.

Dry heat has au opposite effect to that of hot water, usually *darkening* the color of the image. On exposing a plain paper print simply fixed and thoroughly freed from hyosulphite of soda by washing, to a current of heated air, it changed gradually from red to dark brown, in which state it coutinued until the temperature rose to the point at which the paper began to char, when it suddenly resumed its original red tone, becoming at the same time faiut aud indistinct.

The products of Combustion of Coal-gas a cause of Fading.—Coal-gas contains sulphur compounds, which in combustiou are oxidized into sulphurous and sulphuric acids; other substances of a deleterious nature may also be present. A plate of polished silver suspended in a glass tube, through which was directed the current of heated air rising from a small gas jet, became tarnished with white film in the course of twenty-four hours. Positive prints exposed to the same, absorbed moisture and faded; the action closely resembling that oxidation, in being preceded by a general darkening in color, and in commeucing at the edges of the paper. Of four prints exposed, an iodide-developed print was the least injured, and next, a priut upon albuminized paper.

Decomposition of Pyroxyline a source of Injury to Collodion Negatives.—The remarks made by Mr. Feutou at the last meeting of the Society have drawn my attentiou to this poiut. He exhibited collodion negatives, which having been put away iu a damp place, gradually became pale brown, and in the parts which should be *black* by transmitted light. The chauge commenced almost invariably at rough edges and insolated points, leaving the centre of the negative as a rule, the last affected. On examinatiou numerous cracks were visible upon many of the plates, thus seeming to iudicate that the collodion film had uudergone decomposition. The result of this would be the liberation of corrosive oxides of nitrogen, which would destroy the image. Substitution compounds containing peroxide of uitrogen are known to be liable to spontaneous change. The bitter resiu produced by acting upon white sugar with nitro-sulphuric acid is very apt to decompose in this way, and will sometimes evolve enough gas to destroy the cork of the bottle in which it is kept; the solution of the resin has then a strong acid reaction and rapidly fades an ordinary positive print.

On testing the faded negatives I found that the parts which had changed from black to reddish-brown contained, not sulphuret, but a low *oxide* of silver; and further, that the effect might be exactly imitated by acting upon the unaltered portions of the negative with nitric acid ot permanganate of potash. The above explauation is therefore no doubt correct.

These facts are interesting, and iudicate strongly that collodion negatives, containing in themselves the elements of their own destruction, should be protected from moisture. Mr. Fenton's experience proves this, since he observed that *varnished* negatives in the same box with the others, escaped the action.

From the London Art-Journal.

PHOTOGRAPHIC EXHIBITIONS.

The Photographic Society has during the month opened its third Exhibition. Fenton's Crimean photographs (noticed *Art Journal*, October) are now exhibited in Pall-Mall; aud Robertsou's photographs, taken after the fall of Sebastopol, are to be seeu iu Regeut Street. The fact, that three exhibitious of sun-drawn pictures are opeu in the metropolis at the same time, sufficiently proves the growing interest iu this beautiful art.

The present appears a favorable opportunity for examining the state aud prospects of photography—and, with these public exhibitions to refer to, we shall find no difficulty in directing attention to illustrative examples of each poiut with which we shall have to deal.

During the last year or two, there have not been any considerable advances in the *science* of photography, but the *art* has been greatly improved. When the discoveries of Daguerre and Talbot were first published to the world, several experimental philosophers seized upon the subject, and their industrious researches were soon rewarded by the development of new aud unexpected truths. These directed the way to secure improved sensibility in the photographic agents, and pictures were in a little time produced, in a few seconds, superior in all respect to those which formerly required, often nearly an hour for their development. Herschel, for example, was the first to point attention to the importauce of orgauic bodies in combination with the salts of silver. He showed that the equilibrium was more readily overturned, and the system of chemical decomposition more rapidly carried forward, when the metallic salt was associated with some of those carbon compounds, which especially possess the power of removing oxygeu from substances with which it is associated.

A knowledge of this fact led to the use of gallic acid as an accelerating agent, aud, although unfortunately the steps are wauting, and we are prevented from tracing the progress of the discovery, we find photographers advancing from the use of paper, to the employment of gelatine aud albumen, and eventually to the introduction of that important agent, collodion. Collodion proved so distinguishingly an accelerating power in photography, that almost every other preparation has given way before it.

In proof of this the present Photographic Exhibition numbers 606 frames of photographs of various kiuds. Of these there are of pictures by the

Waxed paper process	64
The Calotype	78
The Daguerreotype	3
The Collodion	461
	606

This large majority of collodion pictures is, we believe, mainly referrable to the remarkable facility of the process. The preparations required cau be purchased ready for use—and it is almost impossible for the veriest amateur to fail of obtaiuing a picture. We are rather disposed to thiuk that the discovery of the collodion process has had au injurious tendency iu stopping enquiry. The pictures obtained are generally so excellent, that little is desired by the photographer beyond the means of ensuring the permanence of his productions. We have had numerous valuable suggestions for the improvement of the collodion process, many of which have been adopted, but no oue appears to attempt an advance beyond this. There is no reason why other agents possessing all the advantages of collodion, and some which are yet a desideratum, should not be discovered. It is with some regret that we visited the three exhibitions of the Photographic Society, without discovering, with one exception, any evidence of the study of photography as a science. Amongst the members of the Photographic Society we see the names of men eminent in their especial departments of science; and there are others who, although young, have given evideuce of their powers to carry forward original research. Why is it, then, that the ex-

hibition is almost without examples of experimental enquiry? Why is it that the Photographic Journal gives no evidence of the progress of scientific investigation? To produce a picture, the process being given, is excessively easy; any one with industry may succeed in this and even excel; to enquire into the physical and chemical phenomena concerned in the production, is a task demanding much higher powers. There are, however, two frames in the exhibition illustrating—one, the action of the *hydrosulphide of ammonia*, and the other of the *permanganate of potash* on finished photographs, which are excellent examples of one line of enquiry. These are by Mr. F. Hardwick, who has carefully investigated many points in the chemistry of photography, and he, in these examples, seeks an elucidation of the conditions under which photographs are found to give way; these demand a careful study. We have on a former occasion devoted an article to the subject of the fading of photographs, and we still hold to our opinion, that a sun-drawn picture may be rendered absolutely unfading under any of the ordinary atmospheric influences, proper care being taken in the manipulation. So much for the condition of photographic science. Now let us look at the art.

The third exhibition of the Photographic Society is an exceedingly satisfactory one. We miss the productions of some well-known photographers but they are replaced by others, differing from the older hands in style, but in no respect inferior to them in general effect. We conceive there is more harmony—more delicacy—throughout the pictures than formerly. The printing processes have been more carefully attended to, and we have less of that hard contrast, of intense shadows with high lights, than formerly. We also see that the art of photography has had the advantage of leading its students to look at nature with a more careful eye than was their wont. The results of the camera obscura have not always been found to be quite agreeable; sometimes the sunshine, or rather the effects, upon the landscape, were offensively brought forward, and violent results not unfrequently marked the photographer's studies.

These defects, however, our more advanced photographic artists have learned to avoid. They now select natural objects under the more favorable aspects; they look at nature with an eye to the impression which her illuminated surface will make on the chemically prepared tablet; and they select those conditions of light and shadow which give a pleasing photographic result. Some of the landscapes, especially those by J. Knight (497, 502); several by J. D. Llewelyn (504, 511, 411, 443 &c.); T. W. Ramsden's scenes in Yorkshire (533, 545); F. Scott Archer's views (61, 62); those by W. Pumphrey (127, &c.); the delightful little bits of nature by G. Shadbolt (34, 57, and 58) will, upon careful examination fully confirm our remarks.

"Inhaling the Breeze" (58)

> "breathing from the meadows,
> As the west wind bows down the long green grass,
> And the light clouds pass as they were wont to pass,
> Long time ago"—

by Mr. Shadbolt, possesses to us an inexpressible charm; there is a quiet poetry, and a fulness of light about the picture which is magical; it is like a picture by Turner, we can almost feel the west wind soft and balmy. Pre-Raphaelites might study this and some other photographs, and learn how the sun paints, disclosing every minute line on trunk and leaf—yet blending all into one—light melting by undulations into shadow, and shade brightening into sunny glow, like the illumination on summer seas. For minute and yet distinct detail of a peculiar kind, charming in its general effect, we would name (557) *Ferns and Brambles*, by H. White. In one picture by Mr. Archer, and in Bantry Bay (14) by T. Cadby Pouting, we have natural clouds, but we think we have seen more delicate and beautiful copies of "Cloudland" than those. How valuable to the artist would a good series of photographic cloud-studies be, since few know how to paint them!

There are many fine examples of "Ruined fanes, relics of hood and cowl devotion," of crumbling castles and tottering mansions, which show the manner in which Time's effacing fingers produce disintegration of the solid stone. The weather-worn fragment is depicted with every scar upon its face, every channel which the rain drops and the wind has blown. *Scenes from Kenilworth* (45, 46), Dolamor and Bullock; *Ludlow Castle* (10,) Rev. H. Holder; several portions of *Windsor Castle*, by A. F. Melhuish; *The Choir, Canterbury Cathedral* (183), F. Bedford; and some similar productions by V. A. Prout, are excellent studies. Few men could paint as the sun paints; it is not to be desired that they should do so, since the expenditure of time in producing all this wonderful detail would swallow up too much of a man's life, and it would, we fear, as a final result produce marvellous mechanism, to the sacrifice of mind. Photography has its uses,—we fear we see its evils, or abuses, in the way in which some of our artists employ the photographic copy of nature, instead of looking at nature with their own eyes, and mentally fixing some of the ever varying images which are drawn upon the tablets of those wonderful stereoscopic cameras, the human eyes. Yet many are the lessons, if read aright, which are taught by photography.

O. G. Rejlander and Lake Price contribute several artistic studies of a far more ambitious kind than we have hitherto seen. They are all wonderfully clever, but after all they are but the images of actors posed for the occasion; but they all want life, expression, passion. Passion they have none, and yet these pictures tell a pleasing tale. *The three Subjects* (4), by Rejlander, are exceedingly well treated. *The Breakfast Table*, by Lake Price, is a pretty comfortable English interior, in which all is happiness and peace; let us hope it is the artist's home. *The Wolsey—Charles Kean—*(135), by the same photographer, is an exquisite portrait and a fine picture. *The Monk* (150), also by Mr. Lake Price, and its accompanying studies, are good in their way, but they are dramatic representations; and this applies yet more forcibly to the *Scene in the Tower* (139), in which the murder of the young princess is the subject. We doubt the propriety of attempting to rival the historical painter. We believe, indeed, that such pictures as those will have a tendency to lower the appreciation of Art in the eyes of the public, and unfit them for receiving the full impression intended by, or of seeing the beauties of, the artist's production. We do not mean to disparage the works of Mr. Price or of Mr. Rejlander, they are excellent of their kind, but our love of High Art leads us to desire not to see too many of this class of subjects. J. Watson & Co. exhibit an *Academic Study* (227), and the *Broken String* (259), which must also be regarded as an artists's study, and both possess very great merit as such. We have in this Exhibition numerous examples of the applications of the photographic art. *A Frame containing four subjects of Cuneiform Inscriptions* (201), by Roger Fenton, which are copies of the natural size of clay tablets brought from Nineveh, are wonderfully exact. It would be an almost endless labor to draw these relics of Assyrian story by hand—and here we have every character, by one impulse, faithfully depicted in a few seconds. We have *Hindoo Antiquities* and *Egyptian Bas-relief* (210) as other examples of the same class.

"*One of the Engraved pages from the German Edition of the Ars Moriendi, Black Book, date about* 1470" (198), Mrs. L. Leigh Sotheby, furnishes another example of important applications of the photographic art. There has been some discussion on the question of copying valuable records, manuscript and printed books. We have seen examples sufficiently numerous to convince us that any of those things can, under almost any conditions, be faithfully copied by the collodion process. Dr. Diamond has shown the antiquary how excellently well coins can be copied, in the *Tray of Admiral Smyth's Roman Coins* (434); and C. Thurston Thompson exhibits the application of the art in copying enamels (585, 594), Art manufactures (597), and furniture (603). Portraits are numerous, and many of them excellent; we hesitate to particularize, but we must mention Mr. Fenton's *Prince Napoleon* (213), and *Sir Colin Campbell* (195), and Mr. Myall's portraits of *Sidney Herbert* (337); *Lord John Russell* (338); the late *Sir William Molesworth* (339); *Sir George Grey* (371); *The Earl of Aberdeen* (372), and *Sir Cornewall Lewis* (373). Thus our heroes and statesmen, as they lived and looked, are preserved to us, and their

lineaments handed down to future ages. We think we have said enough to prove that the present exhibition of the Photographic Society is well worthy of close examination.

Of the Crimean photographs of Mr. Roger Fenton we have already spoken (*Art-Journal*, October 1855). Mr. Robertson, chief engraver to the Imperial Mint, Constantinople, has produced an interesting series of views taken in the Crimea after the fall of Sebastopol, which are exhibiting at Mr. Kilburn's, 222 Regent street. The sad tale of destruction is here told with strange exactness. The Redan with the breach where the great struggle took place; the Malakoff Tower and Battery, and other celebrated scenes of "bloody strife," are brought home to us, with facines and gabions, in confusion thrown, in a manner which no artist could realize. We were especially struck with the *Barrack Battery*, showing the mantelettes for protecting the Russian gunners. Here we see the excellent engineering of the Russians; and we learn to appreciate the value of these rope protections (*mantelettes*) for the gunners from the rifle-balls: these we have heard a competent authority declare to be the crowning invention of the war.

Sebastopol and Balaklava, with all the strange confusion which distinguishes both, are before the beholder. The curious may find everything here to gratify them. The locality of each heroic or sad event is chronicled. The geologist may study the rocks of the Crimea without crossing the sea; and the architect the buildings which decorated this fine city. The trenches, the tents, the huts, are respectively represented; and—"last scene of all this sad eventful tragedy"—we have the *English Burial Ground on Cathcart Hill*, with the monuments of the brave men who sleep in the embraces of death, but whose memories are dear to the country of their birth, where their names will live and kindle heroic life in the souls of those who must preserve the high character of the Briton for courage and honor.

Photography has achieved wonders. Let any one visit each of the three exhibitions which we have named, and we feel conscious they will leave them with a full conviction that the Art which has achieved the end of the enchanter's mirror, and preserved for us, and shown to us, shadows which cannot fade, of persons and of things which are lost to us, or at a distance from us, must produce yet greater triumphs with each recurring year.

The sun, which gives light and color, has answered the call of the evocator, and become the painter of the objects which it illuminates. In obedience to the bidding of the philosopher it will give us yet more truthfulness, and show us still nearer approaches to life. R. H.

From the Jour. of the Phot. Soc.

EQUATION OF TIME FOR WASHED COLLODION PLATES.

To the Editor of the Photographic Journal:

Sir,—With a given collodion, the most rapid action in the camera, or the minium time possible, is given, *cæteris paribus*, by a nitrate of silver bath of a definite strength. I shall call this minimum time the nomral time, and the exciting bath the normal bath. The strength of the baths is expressed by the number of grains of nitrate of silver per ounce they contain.

Problem—Given strength of the moral bath, and the normal time with a given lens, stop, and light, to find the time of exposure in the camera required, under the same conditions, by collodion plates, iodized in the normal bath, but which before exposure have been washed in baths containing varying proportions of nitrate of silver less than that in the normal bath.

If the strengths of the washing baths commencing with that of the normal bath, are arranged in the descending arithmetical series, having unity for the common difference, corresponding values of the times of exposure in the camera are represented by an ascending arithmetical series, the first term of which is the normal time, which time is also the common difference.

With these data the value of any term in the series is, of course, readily found by the usual formula, which for the present purpose is more conveniently expressed thus—

$$t'=t \times (n-\overline{n'-1})\ ;$$

t being the normal time, n the strength of the normal bath, and n' that of the washing bath for which the time t' is sought.

For example, if the normal bath contains 30 grains of nitrate of silver per ounce, and a collodion plate, excited by it and unwashed, requires 20 seconds' exposure, the time the same plate would require if, before exposure, it had been washed in a bath containing 5 grains of nitrate of silver per ounce, is thus stated—

$$t'=20'' \times (30-\overline{3-1})=20 \times 28=560''.$$

This formula is, I believe, a near approximation of the truth, and such I venture to communicate it.

Honey being an accelerating agent, the time due to the strength of the bath in which the iodized plate has been washed, before syruping, is by its use considerably reduced.

I am, Sir,
Yours obediently
T. L. Mansel

MR. HARDWICH
On the Chemical Composition of the Photographic Image.

In commencing an investigation into the nature of the darkened material which forms the photographic image, many different plans might be followed. The most simple, and the one offering at first sight, perhaps, the best chance of success, would be to prepare a large surface of the sensitive compound, to darken that surface by exposure to light, and to make a careful analysis of it both before and after the process of fixing. There are, however, serious objections to this course; such, for instance, as the impossibility of estimating *organic matter* in an image formed upon a basis like paper or collodion, and also the introduction of impurities in the shape of sulphates snd chlorides, inseparable from the vegetable fibre.

Aware of these and other sources of error, I proposed to proceed in a different manner. Organic matter of some kind being generally required in the photographic processes, it was arranged that the sensitive salt should be supported by an organic basis, but one differing from paper in an important particular, viz. *in being soluble in the fixing bath;* so that, after the light had acted, upon applying hyposulphite of soda, or ammonia, everything not actually in chemical combination with the reduced silver would dissolve, leaving a material which might be analysized in the usual way. Albumen coagulated by nitrate of silver offered, to a certain, extent, the requisite conditions; but cirate of silver was found to be superior, dissolving perfectly in ammonia before, but not after, exposure to light.

The general plan pursued in the investigation was therefore as follows:—First, to ascertain the composition of pure chloride of silver blackened by light; then of chloride of silver with organic matter, or of a mixture of chloride and citrate of silver; lastly, to determine if possible the nature of the change which the image experiences in passing through the fixing bath. In addition to this I have included in the present paper, the relation which inages developed by gallic or pyrogallic acid appear to bear to the same obtained by the direct rays of light.

Composition of blackened Chloride of Silver.—Crystallized chloride of sodium dissolved in pure distilled water was added to a solution of nitrate of silver, care being taken to leave the nitrate in excess. The precipitated chloride of silver was exposed to light in a glass-covered porcelain dish until thoroughly blackened.

The properties of the substance thus obtained were as follows: a violet-blue powder which retains its color when boiled with strong ammonia and hyposulphite of soda, the greater part being dissolved as protochloride of silver, and a small quantity of a grey powder remaining insoluable.

The insoluble portion, after repeated washing in strong ammonia and in water, is grey and spongy, exactly resembling in appearance the silver reduced from chloride of silver by means of metallic zinc: it is unaffected by acetic acid or ammonia, but easily dissolved with evolution of red fumes by nitric acid. It shrinks considerably on drying, and becomes brilliantly metallic when rubbed. Exposed to a red heat it is whitened in color, and 1 per cent. of volatile matter (hygroscopic water ?) is expelled.

These properties correspond with those of metallic silver; and hence it is reasonable to suppose that chloride of silver acted upon by light is reduced to the condition of a *subchloride*, which, in passing through the fixing bath, is decomposed into protochloride of silver and metallic silver. To confirm this idea, I have examined the properties of the subchloride of silver formed by the action of a plate of metallic silver, and I find that this *decomposition by a fixing agent* is one of its most characteristic properties. As, however, the *suboxide* of silver, obtained by precipitating subcitrate of silver with potash, is likewise decomposed by hyposulphite of soda, or by ammonia, it is possible that chloride of silver reduced by light may contain both suboxide and subchloride,—that it may in fact be a species of *oxychloride*, as many chemists have thought. The question is interesting to photographers only in so far as relates to the action of light upon chloride of silver *upon paper*, and in this case, viz. in presence of organic matter, we have proof, as I shall presently show, that a true suboxide of silver is formed, as well as a subchloride.

Action of Light upon organic Salts of Silver.—Pure citrate of silver with an excess of nitrate of silver darkens in the sun's rays to a chocolate-brown substance, which, when treated with ammonia or hyposulphite of soda, is decomposed, a small quantity of an intensely black powder being left insoluble. In a second experiment a mixture of chloride and citrate of silver was used, but with the exception of the compound darkening by light more rapidly, the result seemed to be in other respects the same. By operating on a large bulk of the citrate, I was enabled to obtain several grains of the residual black powder; the properties of which, after careful washing, were these:—

A flocculent substance resembling animal charcoal in appearance; excessively finely divided and possessing great opacity, so that when shaken up with water it renders the fluid inky black, and is very slow in subsiding. Insoluble in the strongest ammonia and in acetic acid, both hot and cold; imperfectly dissolved by nitric acid, leaving a flocculent residue. When dried it shrinks to a very small bulk, and becomes lighter in color; the pulverulent mass assumes a dark metallic lustre on applying the burnishing steel.

When ignited, this black powder gives off empyreumatic fumes, and a carbonaceous deposit condenses; at the same time it becomes white and metallic in appearance, amalgamating with mercury more readily than before. Analysis indicated that 6·5 per cent. of volatile matters were expelled by the ignition. A second experiment gave a result differing quantitatively from the first, but agreeing as regards the presence of volatile and carbonaceous matter.

It is evident, therefore, this substance, obtained by reducing, and subsequently fixing, citrate of silver, is not identical with the metallic silver left on treating pure chloride of silver in the same way. *It contains organic matter*, which cannot be separated without destroying the characteristic black color by reflected light. I think it doubtful whether oxygen is present in any quantity, because the ammonia used in fixing tends, as before shown, to leave the compound nearly in the condition of metallic silver,

The fact of the powder assuming a "bronzed" appearance when rubbed may perhaps be thought to prove its metallic nature, but in reality this is a character of no value, since the suboxide and the carburets of silver are both metallic in appearance.

Preparation of SENSITIVE SURFACES *with and without the aid of organic matter.*—The modifying influence of organic substances upon the reduction of silver salts by light is peculiarly seen when operating with the sensitive compounds in a fine state of division. A plate of ground glass should be coated with pure chloride of silver in the manner recommended by Sir John Herschel, viz. by placing it in water holding finely divided chloride in suspension—and compared with a second plate covered with a mixed chloride and citrate of silver, a little albumen or gelatine being added to bind the particles together and to prevent them falling away from the glass. In each case there should be a proper excess of nitrate of silver, but no crystallization should be permitted, as it tends to detach the sensitive layer.

For convenience sake we may term the first plate, containing only chloride, plate A, and the second, having chloride and organic matter combined, plate B. On exposure to light the latter is found to be the most sensitive, darkening to a deep brown hue, and then becoming *bronzed* and very dark by transmitted light. Plate A assumes only a slate-blue tone, remaining comparatively translucent and refusing to bronze. A difference between the two plates will be seen on treating both with hyposulphite of soda; not only in the fact of the violet subchloride of plate A almost entirely dissolving, whilst the bronzed surface of plate B is comparatively unaffected, but also in the *color of the deposit* after fixing, which in the former case is white by reflected light and pale violet by transmitted light, but in the latter dark and opake, however viewed.

The action of oxidizing agents, represented by permanganate of potash, and of sulphuretted hydrogen, affords another convenient means of distinguishing the plate prepared with, from that prepared without, organic matter. The image upon plate A, which, from the mode of its formation, we suppose to consist of metallic silver, is altered in color by a solution of the permanganate of potash, but does not lose its intensity, the power of obstructing light being the same as before; but the film on plate B, in which the citrate and gelatine were used became under the the action of light altogether blacker and more intense than the last, is converted by the oxidizing agent into a brownish-yellow substance, pale and translucent.

The application of sulphuretted hydrogen discloses another remarkable peculiarity of the photographic image—its *intensity* being lowered, and in some cases altogether destroyed by a continuance of the action: sulphuretted hydrogen, however, does not obliterate a layer of finely divided metallic silver! so far from doing so, it renders it *darker* both by reflected and transmitted light; and it will be found on printing an image upon pure chloride of silver supported by a glass plate, that it will *gain in intensity* by a prolonged immersion in a solution of a sulphuret.

The two tests, viz, permanganate of potash and sulphuretted hydrogen, are therefore, I think, sufficient of themselves to show that the photographic image is not metallic silver, but that it contains silver *combined with other elements*, from which it cannot be detached without an evident and destructive alteration in the color and opacity of the impression.

It is certain that images proved to contain very different quantities of silver may possess equal power of obstructing light, and therefore it follows either that they differ in composition, or, as an opponent taking the opposite view might suggest, that *molecular condition of the metal varies in the two cases.* But the difference in properties between images prepared with and without organic matter is too great to be explained in that way, even if there were no other evidence,—in addition to oxidizing and sulphuretted agents, I have tested photographic prints with a variety of other destructive substances, and have invariably found them to yield, in a space of time from twenty to one hundred times less than that occupied in obliterating by the same test, an image prepared by Herschel's mode upon a glass plate.

The well-known properties of metallic silver, and its power of resisting oxidation, are therefore no guide to us in estimating the permanence of photographic prints, and must be dimissed from the mind if clear ideas upon that subject are to be entertained.

Rationale of Positive Printing.—The early researches of Sir John Herschel and others have established satisfactorily the *deoxidizing* tendency of white light; but these ascertained facts are often lost sight of in explaining the theory of positive printing. Too much stress is laid upon the *chloride* of silver and the

loss of chlorine which it sustains on exposure to light. Photographic prints are indeed readily formed upon chloride and nitrate of silver, but they can also be produced with salts of silver containing no chlorine; and the ultimate result as regards general appearance and properties is not much affected by the change. When in addition to this we consider that no chlorine remains in the finished proof, the violet-colored subchloride of silver being *decomposed* in the fixing bath, we are prepared to allow that the chloride plays only a secondary part, and that the image is really formed upon a *protoxide* of silver, which in contact with organic matter is reduced by the agency of light. The darkening of albuminate of silver or citrate of silver by the sun's rays may be taken as the type of photographic printing; and the result is the production of a surface of a red-brick tone, which contains a suboxide of silver. With the citrate or albuminate may be mixed *chloride of silver*, and the sensitiveness of the paper will be much increased, but after passing through the bath of hyposulphite of soda the same red tone will be seen. Next omit the citrate and use only chloride with nitrate of silver; the fixed print is then slightly darker, but still of a red color, and possesses the same general properties*.

It is important to notice that those organic compounds of silver which are reduced to colored subsalts by the agency of hydrogen are also affected by light, and *vice versa;*—thus citrate of silver† proves to be a photographic salt, and the albuminate of silver long used in photography is, I find, *reddened* by the action of hydrogen. The conclusion, therefore, becomes almost inevitable that the two actions are similar, both being of a reducing or deoxidizing nature, and having this peculiarity in common, that the reduction is often suspended at an intermediate point, and does not necessarily pass into the stage of metallic silver.

It may be supposed further that the suboxide of silver exists in the photographic print in a state of chemical combination with the organic bases employed to support the sensitive layer‡. The following experiment seems to me to prove this:—

Take a portion of the chocolate-brown powder obtained by exposing citrate of silver to light, and act upon it with hyposulphite of soda; it changes at once from red to black, and is greatly lessened in quantity, the bulk of the mass in fact dissolving in the hyposulphite. Now repeat the experiment with a layer of citrate of silver *reduced on paper;* little or no alteration of color or loss of detail with them occur in the fixing bath, thus showing that the subsalt remains attached to the vegetable tissue, and is thereby protected from a solvent action which would otherwise destroy the existing compound by dissolving out a protosalt of silver and leaving a substance approaching more nearly to the character of a metal. Knowing such to be the case, we should expect to find photographs on paper *less perfectly reduced* and hence more susceptible of injury than a picture formed on chloride of silver supported on a glass plate.

The difference in the action of chemical tests upon *albuminized* and plain paper prints is a further proof of a positive chemical union between the reduced silver compound and the organic supporting basis. The albuminized print is slightly more soluble in cyanide of potassium and hyposulphite of soda, but considerably less affected by oxidizing agents and by chlorine. This cannot be explained by a mechanical action of albumen cementing together particles of silver and opposing the entry of liquids, because then the protective effect should be the same to all tests; but it is at once understood if we suppose that the albumen remains in permanent chemical combination with the suboxide of silver and forms a part of the colored surface.

Before leaving this subject of the chemical changes which take place during the process of photographic printing, it must be added that careful observation seems to show almost certainly that there is more than *one stage* in the reduction of sensitive chloride of silver by the joint action of light and organic matter; and that the first visible change of color indicates a reduction much less perfect than that which succeeds. In particular I would contrast this early stage of darkening with the *bronzed* condition which the paper assumes after prolonged exposure, and, speaking from the results of the application of various destructive tests, it may safely be affirmed that there is in the two cases,—that is to say, between the half tones and the full shadows of the print,—not only a difference in *quantity of material*, but also in relative proportion of oxygen and silver united to form the impression. It is, therefore, *in the lighter shades* that the pictures will be found most liable to injury, presuming that the stability of the impression increases as it approaches more nearly to the condition of metallic silver.

Composition of Developed *Images.*—There are certain points connected with the chemistry of this subject which I am enabled to establish satisfactorily.

First, that in the paper processes, when *iodide* of silver is used to receive the latent impression, the image after development, although lacking intensity of color by reflected light, is more nearly in the condition of metallic silver than when bromide or chloride of silver is substituted. It contains more of the metal in relation to a given amount of intensity, and is less easily injured by destructive tests. A solution of a soluble sulphuret applied to a picture developed on iodide of silver, lessens its intensity, but does not *destroy* it in the same way as it would an ordinary positive print.

Secondly, that the properties and composition of a developed photograph are influenced by the nature of the surface used to sustain the sensitive layer, and that the image upon collodion is different from the image upon paper. Collodion contains pyroxyline, a substance which behaves towards reduced silver salts in a manner different from most organic bodies. By the introduction of an oxide of nitrogen in substitution for hydrogen, the properties of lignine are modified in every way, and the resulting pyroxyline exhibits no tendency to combine with oxides of silver or to assist their reduction. Hence chloride of silver upon collodion darkens to a blue substance precisely resembling the ordinary violet-colored subchloride of silver, and leaving after treatment with hyposulphite of soda a surface with a bright metallic lustre, and showing as a positive when laid upon black velvet; corresponding in these and other particulars to the film of reduced silver obtained by darkening and fixing the pure chloride of silver. The organic substance of pyroxyline appears therefore to be without effect, and as a consequence iodide of silver upon collodion will be found to be less easily developed, and the image when formed will be more metallic than the image of the Talbotype process; it will contain a greater proportion of silver and be less easily affected by all destructive tests, except mercury,—an exception which serves further to establish its near approach to the metallic state.

Thirdly, the collodion, image developed by pyrogallic acid is slightly different from that brought out by sulphate of iron. This latter salt employed in conjunction with nitric acid yields an image which the action of permanganate of potash shows to correspond the most nearly of all the image upon *pure* chloride of silver. The superior opacity imparted by the use of pyrogallic acid may, I think, allowing the correctness of the observations contained in this paper, be fairly supposed to be due to a portion of brown coloring matter left in combination with a low form of oxide, or with metallic silver.

Fourthly, in developing paper photographs, the red substance which is first deposited upon the vegetable fibre on applying the gallic acid, is different in its reactions from the darker precipitate produced by continuing the development. It is more readily

* The *discoloration* of sensitive papers by keeping is interesting as showing the difference between the tint of the subchloride and the suboxide of silver. The organic matter exercises a slow reducing action upon the nitrate of silver, even in the dark, and after some months the paper becomes *reddish* (like a print fixed in hyposulphite of soda), but it does not assume the violet-blue tone of the subchloride of silver; no separation of chlorine appearing to take place when light is excluded.

† Citrate of silver has been shown by Wohler to form citrate of suboxide of silver when heated in hydrogen.—*Ann. Pharm.* 30. 1.

‡ Black suboxide of silver precipitated from the red citrate of suboxide by potash, appears to resemble the *mordant* substances, alumina, oxide of tin, &c., in having an affinity for coloring matters and also for vegetable fibre. When agitated with a solution lightly tinted with cochineal and burnt sugar, it carried the color down. On attempting, however, to *dye* a simply fixed photographic print with decoction of logwood, no very marked result was obtained.

acted upon by destructive tests, and from its easy solubility in hydrochloric acid may be supposed to contain a greater proportion of oxygen. Developed prints therefore, which are of a bright red color after fixing, will be found to correspond in permanency to positives obtained by direct action of light, more nearly than to collodion or even to Talbotype negatives. If the advantages obtainable by development are desired, the action of the gallic acid must be continued until the deposit forms a thicker layer and becomes blacker in color.

In conclusion I may observe, in the way of recapitulation, that the point for discussion appears to be this:—Does light in acting upon salts of silver reduce them at once and perfectly to the metallic state, or may the process be considered a gradual one, passing through the stage of suboxide before reaching that of metallic silver? It has been my object this evening to establish the latter view, and to show you that it is the *use of paper*, and *the substitution of chloride for iodide of silver*, which makes the essential difference in the composition and properties of photographic prints, as compared with those of collodion negatives.

Mr Pollock.—All must feel deeply indebted to Mr. Hardwich for the paper he has this evening communicated; and I think we ought, if possible, to follow out the discussion in the line he suggests, this being the first attempt to explain the nature of the image. There is one point upon which I should be glad if Mr. Hardwich could give us further information, and that is, whether he has found that the coloring matter enters into chemical combination with the suboxide of silver, or is united to it only mechanically; because, if he found that the cochineal was not easily separated, it would seem to me the best proof of the fact that the photographic image is a true chemical combination of silver, or suboxide of silver, with organic matter.

Mr. Hardwich.—I agree with Mr. Pollock in thinking that mordant substances combine chemically with cochineal and such bodies. I cannot state the exact value of suboxide of silver as an agent for retaining coloring matters, but I do not suppose it to be at all equal to alumina in that respect. My object was simply to show that it did possess an affinity, and therefore I employed a *dilute* solution of cochineal; but, on repeating the experiment with burnt sugar, and adding a larger quantity, the coloring matter was not perfectly removed. I believe many metallic oxides will combine with cochineal; and I have certainly noticed that the *protoxide* of silver has an affinity for it.

AMBROTYPE vs. COLLODIOTYPE.

We have already given our opinion of the St. Louis controversy, and have nothing further to offer in regard to it, except that we can only express our utmost contempt for Messrs. Moore & Fox, for the ill-bred and Billingsgate language they have chosen to explain their ideas. If our opinion in regard to the respective merits of the *Daguerreotype* and *Ambrotype* is thought to be worth anything, and the desire of those who send us the objectionable advertisements is, by doing so, to draw that opinion out, we shall not hesitate to give decided preference for the *Daguerreotype* over the *Ambrotype* in its present crude state; that is over the positive glass picture known as Ambrotype; but we can say to our friends that we have seen specimens of positives on glass that will eventually entirely supersede all other glass pictures. We have not yet learned what disposition the inventor will make of his discovery; but we are disposed to think that the most liberal terms will be accorded to those desiring to practice it. The following amusing letter will give zest to the "Ambrotype controversy:"

Mr. Snelling,—*Sir:* We have just seen a St. Louis paper, in which were three lengthy cards addressed to the citizens of that place, by as many different operators (among whom was our friend "Fitz), and the way they gave the Turpentine Patent-Double Glass-self-sealing-indestructible-cement man *fitz*, is a caution; I believe his other name is *Moore*, and we would advise him to seal himself up between a couple of glasses, or he'll soon be *no more*; they are *developing* him rather strong and we're afraid they'll *neutralize* him entirely. Mr. Fox's article is *capital*, and we would suppose that after this we would hear of no *Mo(o)re Fox* hunting. Our friend Fitzgibbon says that no *Glass Pictures can equal a fine Daguerreotype. We* have always said the same and so has every successful daguerreotypist, and that is the very reason that the Turpentine Patent has fallen into the hands of 2d class operators, which is the case in nine cases out of ten, (our esteemed friends Faris and Tomlinson are honorable exceptions); they looked upon the Ambrotype as a perfect "god-send," but instead of using it as such, they fall to abusing every thing and every body. We have often wondered whether the Turpentine patent included the right to "cut, gouge," and "bully," for such has been their course of proceeding in every place we have heard of, and *all* have only treated their vile emanations with silent contempt. So far as our "stamping ground" is concerned, this is the case, and we are now reaping the benefits, for a reaction is taking place and people begin to look for themselves, and will not "go it blind" on an Ambrotype.

We doubt the wisdom of our St. Louis contemporaries policy in paying that barn-hill fowl so much attention. Wouldn't it be better to call all positive pictures put upon single glass, some other name (Collodiotype for instance); let it be adopted throughout the whole country, advertise it as an improvement on the Ambrotype, or drop the mention of the latter entirely, in this way the Ambrotype would lose the importance which a constant quarrel gives it, and the "Turpentine man" would soon be forgotten; as it is now, he has a decided advantage in the prestage of a patent, and being able to call his pictures the genuine, yours the spurious, which has great weight with some people, notwithstanding yours may be much the best; if you choose to use two glasses, French varnish is just as good as Balsam—but we have found that a *grand* Collodion effect may be put up any way; the best varnish we have ever found we made by diluting Balsam with Turpentine until very thin; we also added Balsam to our Asphaltum varnish. If this is done there is no danger of the backing ever cracking. We sometimes use the latter directly upon the Collodion, if we are in a hurry; but we are now using a new collodion process by which we produce pictures which need neither Balsam or varnish; they are *transparent* without it. We put them up any way we choose, either side out, colored like a daguerreotype or plain; they are certain death to Ambrotypes, and we wish all who are "pestered" with the "Turpentine" *varmints* would give them a dose of Spereotypes (the name of this new style of picture). We have never seen so *attractive* or so saleable a picture and *no man can sell one Ambrotype* where we can sell *four* Spereotypes, they do not absorb light like the Ambrotype, nor reflect it like the Daguerreotype. We wish all would adopt these two plans, or one or the other, for the Turpentine men must be beat at their own game; then people will hear what we have to say in praise of the daguerreotype, which we believe will outlive them all. But 'tis no use blowing against the wind; if they will have a glass picture, give it to them—we give them anything they want; *but we generally* make the kind we can make the best at the time.

Yours, &c.

Webster & Bro.

Ammonio-citrate of Iron.—A combination of citric acid and ammonia with iron &c., is obtained by dissolving pure iron filings in citrate of ammonia. When the filings are reduced one half, add a little water, filter and evaporate to dryness. Papers washed with this compound in a certain state, are of great sensibility, and give pictures of great depth and sharpness, but they often spontaneously darken on exposure and become eventually obliterated.

PHOTOGRAPHY AND THE ELDER FINE ARTS.

" *Solem quis dicere falsum audeat?*"

The art of Photography having acquired celebrity and universal acceptation it may be interesting to look back on its brief race to fame and favor, and its connexion with, or bearing upon the other fine arts. It is but as it were yesterday, that Nolté and Daguerre contented for the priority of the invention, and now it is spread over the civillized world and applied to many purposes of utility, beauty, and sentiment. That it can be an aid to justice, a preserver and extender of intelligence, a nurse of social affections, an exact copyist of things removed by distance from general observation, and an exponent of the better feelings of human nature on the widest and most comprehensive scale, are qualities which exalt it to a very high position among the greatest discoveries for the welfare and happiness of mankind.

It may therefore deserve that we should throw a retrospective and somewhat fanciful glance upon its original source or cause and revive a little of our ancient classic lore in honor of the modern accomplishment of science.

The Sun, the grand practioner of painting, doing more in one year than all the schools have done since the creation, was intimately connected with Air, and Light, and Love from the beginning of time. He was worshiped by all peoples in all ages, Egyptian, Hebrew, Assyrian, Persian, Phænician, Chinese, Indian, Scandinavian, and Grecian. But during these pristine movements of man upon earth, his offices were confined to the division of seasons and the marking of years; and it was only, as far as tradition can be trusted, in the inspiring clime of Greece, and among beings of the noblest intellect, that he first indicated his capacity for the illustrative arts. The production, to be sure, was only a shadow on the wall; but it was the first likeness on which complacent love could dwell, and the original prototype of portrait, dear to the heart even when so faint and imperfect, and dearer still when permanently fixed and cultivated into startling resemblance.

And here the simple effect rested for centuries, unless the black unmeaning silhouette stirred up a disagreeable memory of it; and human ingenuity devised and resorted to other methods for prolonging the existence of cherished objects. Without referring back to Egyptian tombs or mummy-cases, or having aught to say of Euchir, cousin-german to the fabulous Dædalus, who is stated to have introduced painting into Greece, or of Philocles or Cleanthes, the reputed inventors of painting in outline, or even of Apelles, the Vandyke of his day, alone thought worthy to paint the likeness of the mighty Macedonian, we may illustrate our subject by noticing the manner in which antecedent styles were commenced and made progress towards unsurpassable excellence, from which they sometimes feil into inferiority and error. Photography is now making rapid strides on its way upwards; and it behoves its professors and patrons to see that its steps are safe and its motion unexposed to retrograde. It is of splendid descent. Its fountain is the glorious luminary of life and day; its medium is the wonderful hyparxis of Plato, light (the *what is it!*); and its production is the realization of the third and last element of this sublime philosophy, the work of ineffable agensies applied to material purposes by human ingenuity and skill.

But the pictorial art in all its branches began with hard outlines, imperfect perspective, poor imitation, want of expression, and absence of power. In landscape, instead of natural gradatious and atmospheric distances, the artist heaped a temple or a river above a mountain, on the same plain; and a difference of size in the human figure not only distinguishes the principal characters from the *oi polloi*, but confounded every idea of nearness or distance. Except for being big and little, the level was as complete as the staunchest advocate for the equality of the species could demand. A period however afterwards arrived when genius struck out a new line, and, according to scientific rules, approached closer to the appearances of nature. The chaos was cleared, and the truth of effects and proportions was assimilated. The aërial perspective was attained and matured and the right men were appointed to their right places, at hand or afar off. Anon the employment of oil was found to be coefficient with an immense addition to colors and tints, as well as to novel combinations, the extension of the higher properties of the art, and the security of its withstanding for a much longer period the attacks of humidity or time.

Thus by degrees the art of painting reached the marvellous pitch of verisimilitude, accompanied by loveliness, grandeur, and expressiveness, which we witness in its most successful efforts when the really great masters reigned over its varied triumphs. Refinement was at its height, but was in harmony with truth. The ideal painted the lily, but with no ridiculous excess to mock the real. This was the climax of a glorious epoch, and might be inscribed the *ne plus ultra* of artistic attainment, as far as human genius could be exercised upon the representations of the external world.

In the same manner has photography proceeded from its uncertain birth, overcoming mechanical obstacles, and improving in all its resources connected with chemistry and manipulation; for it is not only an art, but a science. The progress has been extraordinarily rapid, and is still going on with the accomplishment of fortunate and lasting results. As in the history of painting we have sketched, it has overcome obstacle after obstacle, and held on its steady course towards perfection. Its grand peculiarity is its being a matter-of-fact art; an art that cannot idealize or flatter. And in this feature it is calculated to exercise a useful corrective influence upon the contemporaneous schools of painting. We have recorded and observed upon the era when the emanations of the easel were in their utmost glory, and the happy union of the ideal and real was perfected. But it is the fate of man ever to be striving beyond the goal at which he has arrived. As in the journey from the happy valley of Rasselas, he no sooner reaches the horizon which bounded his view, than he sees other mountains beyond other valleys, and other horizons stretching away to an illimitable extent; and he pursues his onward struggle for a termination to which there is no end. The disappointment is no evil, for the pursuit leads to many desirable acquisitions by the way, and on the right and left a multitude of things beneficial to mankind are sure to be found. Sometimes, however, the enthusiastic wayfarer may mistake the path, and, like John Bunyan's Pilgrim, flounder into a slough instead of treading upon firm ground. Thus in painting, by aiming at graces beyond the reach of art, ambitious successors of Angelo, Titian, Raffaelle, Correggio, and Rubens, would gild the refined gold with wasteful prodigality, and giving the rein to the imagination, plunge into an ideal which had no prototype in nature, and produce fictions and chimeras instead of actual semblances recognizable by reason and common sense as the likeness of something visible in the heavens or on the earth. One of the valuable services of our "matter-of-fact" Art will be to check this aberration, and restore us to a more satisfactory condition than that which has been produced by pseudo enthusiasm, ignis fatuus argument, and maniacal raving or blind ignorance of critical foolery. If the absurdities of the modern ideal do not vanish, it will not be the fault of the lessons of photography. No doubt it has been facetiously called the "foe-to-graphic" art, but in this respect it is calculated to be the reformer of graphic art; and with regard to any incongruity between the two, it ought to be remembered that every advance the photographic art has made, and is making, serves to assimilate it more closely and consistently with the finest capabilities of the elder system.

We remember an address delivered by the late Mr. Whitbread at an artist's fund anniversary dinner, in which he expatiated on the gratification and delight derived from portraits, the sweet emotions they cherished within the sphere of private life, and the insight into the character of famous public personages which they often conveyed. What would we give, he said, for genuine likenesses of the heroes, legislators, poets, historians, philosophers and other worthies of former ages whose deeds or intelligence had descended to our day, all along the stream of time inspiring virtue and teaching wisdom? What would we give to have their lineaments before us? Had the sun displayed his artist power two or three thousand years ago, we need not have wished for and lamented the want of this enjoyment, nor have to accept, apocryphal, or rather imaginary likenesses, as the true effigies

of immortal individuals, though like the Irishman in Lover's whimsical song, each might sing,—

My shadow on the wall
Is not like myself at all!

To an immeasurcable extent the photographic art may be entrusted to supply this desideratum to fnture times, even supposing that it occupied itself more with the Dii Minores than the Majores, who may be perpetuated, as salads are dressed, with oil. And we deem this the most opportune occasion to throw out the hint, because it has just occured that Earl Stanhope in the House of Peers has obtained a favorable hearing to the proposition for establishing a National Portrait Gallery to preserve the likenesses of the mememorable men who illustrate the history of our country, and to which an auspicious answer has been accorded from the throne. However shaped or modified therefore, it is very likely that project will be carried into execution, and that we shall have acres of canvas exhibiting good, bad, and indifferent specimens of the painter's art, and presumed to be tolerably accurate resemblances of the original subjects. So far so well. But to complete, if uot to invigorate this tribute, might we not venture to suggest the important addendum of a Photographic Series, executed by the first hands and according to the highest degree of excellence? How interesting would it be, after satiating curiosity on the features of illustrious prinees, divines, statesmen, and warriors, who had played prominent parts on the world's stage, to seek, and find and study, in a multitude of instances, the miniature, but generally the more faithful likenesses of those who in various ways had accelerated the progress of civilizations, and contributed to the welfare and happiness of their fellow-creatures! The comparatively noiseless benefactors of their kind, the disceverers, the inventors, the improvers, the dissimiuators of useful arts, the ingenious mechanician, the skilful agriculturist who has made two blades grow where one grew before, the applicant of steam or electricity to new and beneficial purposes, the coutriver of couveniences or enjoyments previously unknown, in short, the little candles lighted in obscure places which throw a great light over the whole social system, and illuminate it from its vast circumference to its inmost recesses,—do not they deserve a record and a rememberance? How many such are strugling around us at this hour, big with ideas aud fertile with contrivances, which may be wrought out by others, or may raise them to rank with the Myddeltons, Arkwrights, Peels, Walls, Stephensons, and other distinguished men, who have fortunately emerged from humble circumstances to make themselves great names and found exalted families! From the former category, as well as from the latter, would we desire to see the National Gallery enriched and adorned; for deeply are we iudebted to many who have never risen to emineuce, and yet who are sufficiently identified with valuable discoveries to entitle them to the estimation of their country and a grateful niche in their country's Pinacothek.

So for centuries to come may photography minister to the intellectual gratification and instruction of succeeding generations, as the art is already calculated to enforce the soundest of lessons upon every other branch of pictorial ambition. It shows what Nature is and was before pre-Raphaelites magnified her minutiæ, because they knew no better how to express them, or their imitators gave to her minor details a prominency which she only imparted to her important features; and by this it is to be hoped that, as we have observed, it will tend to limit that growing tendency to substitute ideality for reality, and vagueness for imaginings for truth. An orange-peel boat on a sea of blue yeast, with a yellow sky and an horizon composed of a misty maze of colors, is happily above the powers of the sun iu photography; and as that orb at the creation educed order out of chaos, so it may happen that his modern influence, as a supreme artist, may bring back this exuberant coufusion within rational rules, and permit us to have the sublime and beautiful only reverently touched, and not perverted by the peneil of genius.

As an ally as well as a monitor, the art of photography must continue to augment in utility, and perform important functions in coöperation with all the other arts of painting and engraving. The entire habitable globe is open to it, and it can advance laden with treasures from every quarter (unapproachable by other means), for painting to enlarge or engraving to perpetuate and spread. Of the human face divine its copy is accuracy itself, and from this it cau be embellished to the heart's desire and the taste of fond affection. There is also the advantage of comparison to be derived from the new process; and thus, independently of its intrinsic claims upon our wonder at the process of its instantanious production and extraordinary manipulation, our admiration of its fidelity, and our affections for the sympathies it is so delightfully formed to cherish, it challenges our warmest regard as one of the most useful discoveries even of the nineteenth century, illustrated by steam-vessels, railroads, and electric telegraphs, and as one of the purest sources of instructive amusement and social delight.

Laud to the glorious Sun, whence we reap this new pleasure; the self-same sun which Shakspeare sings, " that shines upon the court, and hides not his visage from the cottage, but looks on all alike?" And so it is that palace and hut, temple and ruin, wide landscape and bosky nook, and every diversity of the human race from every clime and shore, are readily presented to our eyes; the universal charms of nature are spread before us; and from Indus to the Pole we hold communion with our millions of brethren, identified in every shape and aspect, over the furthest boundaries of our mother earth.

From the Jour. of the Phot. Soc.

SIR W. J. NEWTON ON PRINTING BY DEVELOPMENT.

[Read at the Meeting of the Society, April 3, 1856.]

Having received many letters from all parts of the country, and especially siuce my last paper on positive priuting, requesting further explanation on certain points, although it is very difficult to convey by writing, with perfect clearness, the *exact* mode of manipulation of any process, still I will endeavour to be more explicit.

And first, I wish to offer my best thanks to Mr. Hardwich for having acceded to my request, by explaining *chemically* the use of alum as employed by me for the last five years, with invariable success and advantage.

I think it is now tolerably clear, that as my positives have borne the tests to which they have been submitted by Mr. Hardwich, it is reasonable to conclude that they will equally resist *any* state of atmosphere to which they would be likely to be exposed. Mr. Hardwich, however, considers that the strength of the alum which I have employed is " very dilute ;" therefore, *now* I am not particular as to the strength of the solution, especially if there is any tendency to redness of color, after the print is sufficiently developed and removed from the hyposulphite. I have brought a few specimens with me which have been in strong alum until they were sufficiently toned, that is, from one to two whole days.

With respect to alum being "admissible in the majority of printing processes," I am not prepared to offer any opinion, my experience having been principally confined to the developing process for more than nine years ; but as alum has been proved to be beneficial in *one* process, and as it also acts as a *toning* agent, I think it would be worth while for those who print by the usual mode, to make some experiments in this direction, if it were only in consideration of the saving the expense of the gold bath.

I wish also to notice a few observations made by Mr. Malone at the last Meeting, which, if I could have been present at, I should have alluded to at the time. Mr. Malone stated that there was " too great a tendeucy to dogmatize (!) upon the exact nature of the image." I think, however, that Mr. Hardwich disposed of that question ; but with respect to the image " improving by time," my long experience enables me to *speak most decidedly on that point*, viz. that they *do* improve up to a certain point, not only in the general effect, but after months, some of the tender parts and half-tints, which were nor discerni-

ble in the first instance, have become fully developed, and more especially so if they have been exposed to a strong light for a few days; indeed, I have not known an instance to the contrary, if the print has been properly cleansed from all redundant chemicals and impurities. All the prints which I have brought with me have much improved since they were taken ; and in two or three from Mr. Fenton's negatives, the light parts, where there is a great deal of marking of stones, &c., were not seen at first, and they will be more developed some time hence.

I do not know whether Mr. Malone has had much practice in the developing process, but, if he has, I think he could not have failed to have observed the above fact; at all events, as I believe that I have had more, and longer experience than any other person in printing by development, consequently I have had more opportunities of observing carefully the whole subject. I therefore repeat, that the prints so taken *do* improve by time, and that the delicate forms become more visible, not only in the lights, but in the shadows. Although I cannot fix the limit up to which they improve, yet this I can state as the result of experiment, that they do not fade by a long exposure to the sun and ordinary atmosphere.

I beg, however, to add that I have no desire to persuade any person to adopt my process,—I wish merely to give the results of my own experience; but, if I may judge from the letters I receive from strangers, it appears to me that the developing process is becoming more generally esteemed. I feel, however, that there is yet much to acquire before it will be generally adopted; but considering its permanency (which perhaps I may fairly take for granted), I think that, *finally*, the process by development will prevail. I will now proceed to explain as clearly as I can the mode I pursue. First melt the parchment gelatine, and then add an equal quantity of camphor water and let it cool; if it should then be found to be too stiff, add more camphor water, to each ounce of which add 20 grains of white sugar, and mix well together by moderate heat,—then add two drops of the oil of cloves to each ounce, shake well together, and then again submit to heat (moderate) for about an hour. Then dissolve 10 grains of iodide of potassium in an ounce of camphor water in one bottle, and 10 grains of bromide of calcium in the like quantity of camphor water in another, and add one drachm *of each* to every ounce of the above mixture. One ounce may be made at a time, that is, the bromide and iodide added ; just before using, filter and brush the paper over on both sides, letting one side dry first, after which (when dry) it will be ready to excite with 25 grains of acetonitrate; mix 50 grains of nitrate of silver in one ounce of camphor water, and add $1\frac{1}{2}$ drachm of glacial acetic acid, to one part of which add one part of camphor water, which reduces it to 25 grains; after exciting blot off, and proceed in all respects as described in the February Number, p. 312.* I wish to observe that I prefer *brushing* the paper over rather than *immersing* it in the gelatine, &c., because I find that too much of the iodide and bromide is, by pinning up, carried to the lower part of the paper, which has a tendency to prevent any image appearing.

When the positives are entirely cleansed and dry, I brush over each side with the gelatine preparation *without the iodide and bromide*, letting, in *all cases*, one side dry first, which gives a bearing-out character, and acts as a kind of varnish, without the gloss, as well as giving strength to the paper, after the repeated washings, &c. ; in this case the gelatine should be brushed over tolerably warm, so that it may *penetrate* the paper, but when used for fixing down the positives it should be used as cool as the gelatine will admit of. I find it excellent for this purpose. In the February Number, instead of *Rose's* paper, it should have been *Rives'*; if, however, I could get a *close-grained and thin English paper*, I should prefer it to the French paper.

W. J. Newton.

N.B.—In order to be more certain as to the proper strength of the gelatine, melt it as above described, and add one part of camphor water; this I will call No. 1. Then take one part of No. 1, and add an equal part of camphor water—this I call No. 2. Then add the sugar and oil of cloves to Nos.1 & 2 as above described separately. No. 2 is the proper strength to add the iodide and bromide. No. 1 may be used for brushing over each side of the positive when finished, and for fixing it down. If a rich brownish color should be preferred, use bromide of potassium instead of calcium.

* Photographic and Fine Art Journal for April, page 112, Vol. IX.

PHOTOGRAPHY ON COLLODION.*

BY D. VAN MONKHOVEN.

Translated from the French for the Photographic and Fine Art Journal.

CHAPTER II.

OF SENSITIZED COLLODION.

Before giving the composition of the sensitized collodion, we will enter into some general considerations upon the rules to be followed in such cases.

We will say first a few words upon the causes of that instability of collodion which renders so many amateurs desperate. If we consider this liquid chemically, we shall be no longer astonished at the changes which are developed in it occasionally in a few hours; paper does not present these disadvantages, for a very simple reason, viz. that the liquids which serve to sensitize it, are not decomposed with so much facility. It would never be believed what researches are necessary, in order to compose a collodion which may be invariable, but to give to our readers a slight idea of the difficulties which are encountered in these experiments, we shall explain some causes of the instability of the collodion, or of its constituent elements, which comprehend pyroxyline, ether and alcohol, on the one side, bromine and iodine united to a metallic base, on the other.

Ordinarily, this solution is slightly yellow. Expose it to the sun for some hours, and we shall find it has taken a very distinct red tint, due to the iodine and bromine which has been liberated, although no acid exists primitively in the collodion. But, since the bromine or the iodine are found in contact with the ether, the latter is decomposed in part, to give birth to the different products which deteriorate it. Chlorine has an effect much more energetic; it decomposes the ether in a few hours. If the ether or the alcohol were primitively acid, it would be liberated from the iodine and bromine without the intervention of the solar light, and the reaction would be found complicated by the presence of the acid.

If alcohol and ether are found enclosed in flasks that they do not fill up completely, acetic acid is formed. *Aldehyde* may also be formed in the collodion, but it is transformed rapidly into acetic acid; hence comes another deterioration. The alkalies also change the formula in commercial collodion and as alkaline iodides are often found in commerce containing an excess, it often happens that the collodion varies from this cause. Finally, water itself sometimes complicates the reaction, if there is any free bromine present. We see therefore what precautions it is necessary to take in the preparation of collodion.

To obtain a stable collodion, it is necessary,—

1st. To withdraw it from the action of light.

2d. To shut it up in flasks well filled.

3d. To employ ether and alcohol perfectly neutral, and containing the least water possible.

4th. To proscribe alkaline iodides which might contain an excess of base.

5th. To avoid the presence of all substances in the collodion which could liberate iodine and bromine. The three first recommendations have been already stated in the preceding chapter. We now will consider the two others with equal care.

We cannot enter in this respect into the details which are purely chemical; special treatises upon organic chemistry develope at length the different decompositions of the ether.

We come to photographic considerations which we must take in order, if we would obtain a good sensitized collodion.

* Continued from page 124.

Collodion must be sensitized in view of the objects to be reproduced. Latterly, metallic bromides have been much employed; but with few exceptions, in a false direction. *Bromides ought not to be employed to render collodion more rapid, but rather to give it the property of receiving impressions equally well under all colored rays.* We know already that with iodine alone, the greens, yellows, &c., do not come. We do not say that these rays have no action upon iodide of silver, but that it needs a longer time to reduce it. It is a very singular thing that the bromide of silver, when employed *alone*, gives images whose tones are very little in harmony with the colors of the model; with the iodide of silver *alone* the same thing takes place, but *united* they receive impressions under all the colored rays, and in properly operating *les desages*, we succeed in rendering with the same rapidity colors the most opposite in chemical action. So the collodion of which we give the formula for views, will render instantly, with a good light, all the tones of a landscape.

Most operators who work every day, have great difficulty in making the portraits of persons who have red hair and beard. As every color with a yellow base makes with difficulty an impression upon iodide of silver, it follows that the negative gives these parts transparent, whence a positive is—where the red hair of the model is rendered black—a capital defect. If they would take the pains to add to their collodion some bromide of cadmium in the proportions that we shall indicate further on, they will easily avoid this difficulty. A second question, not less important than the first, is the choice of the iodide which is to enter into the composition of the collodion, all the iodides giving iodide of silver. It will follow from this, according to some chemists, that the sensibility must be the same, whatsoever is the base. This is not so, for many reasons. Firstly, it is an evident fact that the iodide of different base, must present at the time of the formation of iodide of silver, a peculiar molecular formation which is one cause of variation. Secondly, in consequence of the transformation of the metallic iodide into iodide of silver, the azotate formed being always present in the sensitive bed, will either retard or accelerate the luminous action. A third cause of the variation of the sensibility, is the water necessary to dissolve some iodides and bromides in the collodion; it is a fact resulting from direct experiment, that water causes a loss of sensibility.

Perhaps other causes may be added to those that we have cited, but we are ignorant of them. It is an incontestable fact that some iodides are much more rapid than others.

Moreover, certain iodides give negatives with difficulty,—such is iodide of iron; this effect can be attributed to the instability of the azotate of iron in presence of the azotate of silver, of which it probably changes the properties.

The following is the order of the sensibility of the different iodides, the most rapid being the first. Iodides of cadmium, ammonium, zinc, and potassium; and among the bromides, those of cadmium, zinc, and potassium.

To make comparative experiments with iodides, it is necessary to make use in the first place of *anhydrous* collodion (that is without water), then to introduce some centimetres of water, in order to see what changes in the sensitiveness it will manifest, when we employ the ordinary ether and alcohol. The quantity of iodide ought to be in such proportion, that the strength of the iodides may be equal.

For direct positives, the collodion with acetic acid and of iodide of iron, is extremely rapid, but it supports with difficulty the addition of a bromide. The bromide of iron, although very soluble, has given us no satisfactory result. The iodide of ammonium united to a bromide of ammonium, gives positive images almost as beautiful as iodide of iron; but this collodion is extremely variable, the iodide of ammonium itself being already a very unstable substance.

A third consideration is, to choose an iodide that is not decomposed in the collodion. A collodion prepared with alcohol and ether very neutral, cannot redden without losing its primitive sensibility.

In general it should be kept colorless by the addition of cyanuret of potassium, or still better by that of fluoride of potassium. This last has the advantage of precipitating the water and ought therefore to be preferred. But these are means which take away from them a part of their sensibility, and especially of their fineness. (The fluorides change the formula of collodion with the iodide of potassium, this last precipitating itself when the water is taken away).

In all these cases, it does better to add to the collodion, a flattened fragment of zinc or cadmium; these metals having the effect of combining with the free iodine in proportion to its combination.

Pure silver in powder (obtained by reduction of chloride) has the same effect, but as it gives birth to the iodide of silver, which at first dissolves only by the favor of an excess of alkaline iodide, a moment comes when it is too abundant to be dissolved, and then it is precipitated or muddies the liquid*. With iodide of ammonium, this effect takes place under the action of the sun in some hours.

We are of opinion that the iodide which gives a colorless collodion without these means, is that which should be preferred, if however its rapidity is sufficient. But the iodide of cadmium unites these advantages; the more soluble it is in the alcoholized *anhydrous* ether. The iodides of zinc, of potassium, and of sodium, give a yellow straw color to the collodion, those of iron and ammonium, a deeper yellow. The addition of an acid to the collodion makes it redden at the end of some hours. We cannot discolor it by zinc nor cadmium, for the latter form salts which would muddy it. Now after the rules that we have enumerated, we will give the doses of iodine and of bromide of cadmium which we employ.

COLLODIONS FOR PORTRAITS.

No. I. Positives—

Collodion normal No. 2	100	cent. cubes.
Alcohol and ether (in the proportions indicated at page 123)	200	do
	300	do
Iodide of cadmium	1·5	grammes.
Bromide of cadmium	0·3	do

No. II. Negatives—

Collodion normal No. 2	100	cent. cubes.
Iodide of cadmium	2 0	grammes.
Bromide of cadmium	0·4	do

COLLODIONS FOR VIEWS AND LANDSCAPES.

No. III. Positives—

Collodion normal No. 2	100	cent. tubes.
Ether and alcohol (page 123)	200	do
	300	cent. tubes.
Iodide of cadmium	1·5	grammes.
Bromide of cadmium	1·0	do

No IV. Negatives—

Collodion normal No. 2	100	cent. cubes.
Ether and alcohol (page 123)	80	do
	180	cent. tubes.
Iodide of cadminm	3·6	grammes.
Bromide of cadmium	2·4	do

We have seen in the preceding chapter (p. 123) that the normal collodion must include a strength of ether, proportional to the temperature. The ether and alcohol added to make the collodion more fluid should be mixed in the same proportions. In glancing over the preceding formulas, we shall remark in the first place, that we make the collodions for direct positives very fluid, for which we shall give the reason in the chapter upon the silver bath. Consequently the collodion for negative views is made also less thick, because generally the views being strongly in the light would give with the collodion No. 2 two powerful shades, which would make the stereotype too striking

* Besides the silver discolors the collodion with difficulty, and in proportion as it is impure induces no effect.

(peurté) the image presenting too much opposition between the extreme tints. We increase the dose of bromide for the collodions No. 3 and 4, because without this precaution the green color of the model would become too transparent upon the stereotype, and then would not present the model.

The only formula for our different collodions, is—

Portraits........Br.........	Io.	=	1:5
Views..........Br.........	Io.	=	2:3

For negatives or positives we preserve this proportion, diminishing for the last three-quarters. As we see this is extremely simple.

Some authors have published in the special journals, another method to sensitize the collodion, which consists in dissolving in this last, some iodine and bromine in given proportion, then to discolor the solution by a sheet of zinc or of cadmium.

We might believe that this means is excellent, since it amounts to the same thing as forming the iodide and bromide of cadmium in the collodion which adds them to it ready prepared; but this is not so, because the bromine and iodine decompose ether; in certain cases the reaction is so lively, that the flasks burst with noise, on account of the strong tension of the vapor of bromine.

The iodide of cadmium is prepared with great facility. We begin by melting the metal, then we cool it to a certain degree in cold water in order to obtain it pure*.

Afterwards we make in an open flask, the following mixture:

Iodine........................	150	grammes
Cadmium......................	80	do
Water..................	400 to 800	do

Let this mixture stand, but from time to time shake it. In eight days all the iodine will have disappeared, and the liquid will have a light yellow color. We filtrate and evaporate and so collect 220 grammes of iodide of cadmium.

The bromide of cadmium is prepared in the same manner, but the reaction is much more rapid.

Bromine........................	90	grammes.
Cadmium.................	70 to 80	do
Water........................	500	do

These two products are white, soluble in collodion, and give a colorless solution in ether and alcohol, but the cadmium which has been used in the preparation should be very pure.

The collodion with iodide of zinc, has nearly the same properties as that of the iodide of cadmium, but it is inferior in rapidity, and much more quickly acidifies. Notwithstanding these defects it is employed by very eminent operators. As to the bromide of zinc, it has given to us hardly any satisfactory result.

We add to collodion different substances to obtain proofs purer, more rapid, or more intense. The principal ones we know are iodine, bromine, acetic acid, gallic acid, alkaline chlorides, the cyanuret and fluoride of potassium, prosulphate of iron, nitrate of lead, &c. Iodine is added to collodion to obtain some positives upon glass of a beautiful color and very transparent; also to 200 grammes of collodion we add one centigramme of iodine. This substance colors the collodion a reddish yellow. Bromine has the same effect with less intensity. In both cases there should be in the collodion neither zinc nor cadmium to discolor it. We know already the effects of acetic acid and the cyanuret and fluoride of potassium. Gallic acid renders collodion more rapid.

Alcohol....................	100	grammes	
Gallic acid..................	0·1	do	
Collodion....................	100	cent. grammes.	
Alcoholic gallic acid..........	1	do	do

Of all the substances whose effects we have examined by adding them to collodion, iodine alone offers a progress, and still there is some diminution of sensibility. We ought to take care not to add it to negative collodion, because it renders the silver bath acid, which must not be the case for these images; besides as we have said many times, this substance deteriorates the collodion in a few days.

We have found this means defective, for the proofs are almost always spotted. Gallic acid added in stronger doses renders the images visible on removal from the camera obscura; they can then be developed by its aqueous solution.

If we add to the collodion or to the bath of silver a little nitrate of lead, images can be developed in gallic acid in a very short time (Laborde). The chlorides give to the negative image more vigor.

Alcohol..........................	50	grammes.
Chloride of cadmium.............	1	do
Collodion........................	100	cent. cubes.
Solution preceding................	5	do

The chloride of cadmium is white and very soluble in alcohol. It is prepared by discoloring the cadmium hot in chlorohydric acid, and evaporating it to dryness.

If the sitting is very long, and the light of the object to be reproduced very strong, the image is visible on being taken out of the camera obscura. The rapidity of the collodion is diminished by the addition of this substance.

We have tried the addition of sulphate of iron to the collodion, and as we had forseen, the image was veiled and spotted in every way.

CHAPTER III.

CLEANING OF THE PLATE-GLASS.

The cleaning of the glass is a very important operation, which ought to be done with particular care, as every impurity makes a spot in the reducing bath. New glasses especially show these, on account of their greasy surface being full of substances which adhere with an astonishing persistance. For positives we can employ ordinary glass, but the cleaning of it is still more difficult, on account of the unequal grain of the surface.

For negatives it is necessary to employ plate-glass, because the bubbles and other defects of common glass would be visible upon the counter proof on paper; however for the small dimensions, fourths, thirds, and even whole plates, the beautiful white glass can be substituted without too much disadvantage. As a preliminary observation we will say that if the plate-glass is new, it must be cleaned first with water, and then be subjected to a bath, viz.

Water.........................	100	grammes
Cyanuret of melted potassium.....	20	"
Carbonate of potassium..........	50	"

This mixture dissolves fat substances, and removes them completely.

It is spread upon the glass plates covered with this liquid for some minutes, and then washed in a good deal of water.

This first operation clears them of all the grossest impurities, so that they can be treated as if they had already been made use of.

We prefer this alkaline solution of cyanuret of potassium, to mineral acids generally used, because these last act less upon the grease which covers the glass. If these greasy substances are taken away, the acids have a powerful effect and are preferable to that of the alkalies.

The new plate-glasses which have already undergone the preliminary operation which we have just described, or those which have already been employed, are at first subjected to the action of a strong current of water, to remove the bed of collodion. If the latter adhere too strongly, we might remove it with a pad of cotton powdered with *tripoli* (rotteustone). We then put the plate-glasses vertically by the side of each other, upon a piece of card or any other porous matter which absorbs water; in about ten minutes they are perfectly drained. We pass them then through a bath of nitric acid; we can employ for this purpose the little book described on a subsequent page.

* The cadmium of commerce is impure; to purify it, it is necessary to dissolve it hot in chlorhydric acid, then having added the solution to twice its volume of water, to filtrate and throw into the liquor a sheet of zinc well scraped; at the end of some hours, the cadmium is precipitated in the form of grey powder. Drawing out the sheet of zinc, we wash perfectly the precipitate, which is almost pure cadmium, and in a state very soluble for the preparation of the iodide of cadmium.

In the last place, we wash them in a great deal of water and let them dry in the air.

Polishing of the Plate-glass.—After having been subjected to the preceding operations, to the number of twenty or thirty, the glasses are uot sufficiently uniform to give a pure image. It is necessary in the last place to polish them, by subjecting them to a slight rubbing of tripoli and alcohol. We rub them to drying, with a pad of linen, and remove the tripoli with very dry doeskin. We finally dry the edges.

All these operations appear very long at first, and will be so in effect, if we make them upon a small number of glasses; but if we operate upon a hundred at a time, we find on the contrary that they are very rapid. For we spread the acid ou their surface in a very little time; as soon as the last glass of them is covered, we wash them, commencing by that which has received the first coat of acid. In this way we find that we can clean forty half plate-glasses in less than an hour. If by accident a fat body has just touuched the glass we must change the nitric acid for an alkaline bath of cyanuret of potassium which is of extreme energy.

A plate-glass is well cleaned, when condensing the humidity of the breath, it does not let any impurity be perceived, and on the contrary offers a very uniform surface. A little practice will teach more on this head than all the precepts that can be giveu.

The influence of great heat upon the surface of glass, has been very well described by M. A. Gaudin, in *La Lumière* of the 5th of August 1854.

"It is generally believed that heat is favorable to the production of proofs upon collodion: this is true if we speak of the pleasaut weather of Spriug aud Autumn when the heat is moderate and the light at the same time very active. During the great heats of summer, it is another thing; it is not only photographers which have remarked this, and therefore it is important to look into the causes of it.

"The success of proofs upon collodion depends, more than we commonly believe upon the state of the surface of the glasses. Heat is also a great obstacle to their perfect cleansing. We always blame the humidity; as if humidity could be injurious, when it is the soul of photography. It constitutes an intermediary substance, very useful for the development of images upon the plate of silver, as I have proved a long time ago by ascertained facts and direct attempts: it would be ridiculous to accuse the humidity of sheets of glass in the operations upon collodion, when nothing is done without the preseuce and intervention of liquids.

"Nothing is more proper to demonstrate the extraordinary influence of injurious agents, than the difficulty of obtaining good proofs upon sheets of widow glass which have not yet been in use. Most of the glasses of this kind resist an ordinary cleansing, but if not well cleaned we shall obtain nothing and will be naturally led to accuse, one after the other, all the substances used.

"Dnring the great heat, we could not impart this humidity, and it is precisely because there is a want of it that the cleansiug of the plates becomes difficult.

"I had one day operated very unsuccessfully without remarking that I had employed sheets of window glass that had never been used, aud I attributed my failure to the bad preparation of the solutions. Some hours afterwards, I had a conversation on this subject with M. Leborgne, who convinced me that my failnre had come from an imperfect cleansing of the new glass.

"Since that time I have always taken care to employ glasses which had already given proofs, and my success has been constant. Dnring the great heats we have just experienced, I have had occasion to operate twice out of my laboratory, in places where it was excessively hot, and every time I have obtained only veiled proofs of no value. I operated upon common glass, or plated glass which had been long used; it was therefore the heat which was the obstacle. A third time, in heat less extreme, operating with some window glass, I also obtained veiled proofs, and I was goiug to accuse the heat of it when I remarked the singular texture of the acid which washed the proof. It was a kind of frost work (damasquinag) very much accented, composed of little circles very near together, resembling considerably those which bubbles of air produce, when we immerse in the silver bath a transferred collodion (collodion à transport) half dry: but as the whole surface from one end to the other was equally covered with these little circles, this reason was inadmissable. Fortunately I remarked at the same time a spot *in the form of a finger*, covering half of the plate, and resembling entirely a trail of collodion seen by transparency; but the spot was upon the proof, or rather under the collodion, for rnbbing with the cotton did not diminish its intensity, no more than that of the *frost-work.*

"I observed to the person before whom I was operating, that these spots doubtless belonged to the glass, as they reappeared and resisted the rubbing with tripoli which could not be pushed to excess.

"I then rubbed the plate with a wooden polisher covered with rag and thick tripoli for about a minute, after having dried it as usual, and recognized by a breath that it showed uo equality. I made another proof: the frost-work appeared again, the principal part in the form of a finger. Finally, having rnbbed it a third time within ten minutes, with tripoli, I obtained a proof tolerably pretty, upon which conld still be discerned, but feebly *the principal spot and the general frost-work*

"This case, perfectly characterized and ascertained, shows clearly the extreme delicacy of the operations upon collodion; every substance deposited upon the glass, having the property of reducing the silver beyond the action of the light, prodnces infallibly its effect, which manifests itself by grey places marking the proof more or less.

"This accident is more frequent upon window glass than npon plate-glass; nevertheless the latter is not exempt from it. It must come from the grain of the glass of alkaline silicate, which sometimes forms, upon mirrors in rooms, a network of crystals by the decomposition of this silicate iu contact with the air which yields to it its carbonic acid.

"A mechanical rubbing with tripoli is therefore iusufficient, or at least not expeditious enongh, it would be better to employ an acid; this is why some tripoli, freed from the chalk, and mingled with nitric or acetic acid, is most snitable for new glass, whether common or plate.

"Glasses which have already given good proofs need not be rubbed with tripoli; that powder is found everywhere and soils the silver bath; bnt it is important to clean so far as not to have a greasy plate, which is a very difficult operation. That a plate may be seusitive and give very pnre proofs, for example, positives with beautiful shades, it is necessary that the water poured on its surface run over it in a continuous sheet. If the plate is greasy, it will separate into threads, and almost always give a positive proof covered with a general veil, or very feeble negative proofs.

"The liquid to be employed for glasses that have already been used, will therefore be a mixture of alcohol and distilled acid, nitric or acetic.

"With a little practice, we should recognise plates which are greasy, by rubbing them with a dry rag; if the rag glides and does not adhere at all, the plate is greasy. We change this state by breathing on its surface to condense the humidity of the breath, and by rubbing immediately and strongly with a clean cotton rag; but if the temperature is too elevated, the breath does not condense, and the result cannot be obtained by this means, it is necessary to use again the acidulated liquid.

"When the plate is greasy, the collodion which covers it becomes so; the silver bath will never adhere to it however long it may be in the silver bath, at least I have observed this phenommenon on the hottest day of the year, workiug in a place whose temperature certainly attained 35 degrees *centegrade*; it was of no use to breathe upon my plates, I had no acid to clean them with, and was not able to obtain a siugle proof without a very decided general veil.

"It remains to see if a temperature very near the boiling point of ether, is not itself an obstacle to the employment of a collodion for a transfer, containing very little alcohol. To determine the question I have immersed a plate as soon as the col-

lodion turned; I at least had no general veil, although the proof indicated by its outline and shade after the washing in hyposulphite, that it had when immersed in superabundance of ether.

"During the heats, it will be necessary therefore, after having made the greasy streaks disappear, to examine the plate, the minute after having taken it from the silver bath. If the liquid remains in a continuous sheet, you will be sure of not having a greasy collodion, and if you fear to have a bed too thin to support the operation, the plate can be immersed again; but if, in the course of a minute, the solution retires in places, indicating a greasy state, the immersion must be renewed and maintained longer; however, according to all probability, the plate will give a veiled and spotted proof, on account of the greasy nature which cannot be avoided except by a cleansing according to all the rules.

"I have seen very skilful photographers, unable to do anything during the great heat of summer. They do not know why! but it is true to say that they prepare their plates in workshops where the heat is suffocating and where, consequently, one cannot use the breath. They also neglect many indispensable conditions of the silver bath, which I shall indicate in another article complementary to this."

Very great cold, from 4° to 8° below zero, produces effects equally singular, the liquid tending to freeze on the surface of the sensitized glass, whence spots are obtained of a very regular form.

To be Continued.

DESCRIPTION
Of Alexander Rollason's Patent for certain Improvements in Photography.

This invention consists of improvements in transferring to paper, linen, cardboard, bone, ivory, wood, metal, or stone, the film of collodion or albumen used in calotiotype or albuminized plates, by which a photograph may be removed from the glass or plate on which it may have been produced; or the plain film may be transferred on to certain of the substances above named, and a new base or medium produced for the photographic pictures.

The patentee first proceeds in the manner in which ordinary collodiotype photographs are produced, thus:—Having thoroughly cleansed the glass plate either with spirits of wine, naphtha, water, or tripoli, and finally buffed it with a charcoal buff leather, which will have a slightly greasy surface (and is therefore the better for the purpose), he covers the glass with iodized collodion, or any other similar and suitable filmy material, on which a photograph can be taken; and after submitting it to any of the well-known processes for rendering the film sensitive, such as immersion in a bath of nitrate of silver, he places it in the camera, and takes the picture, which has then to be developed in the ordinary manner, viz. by washing with a solution of iron in nitric or glacial acetic acid, and afterwards fixed with a solution of cyanide of potassium or hyposulphite of soda: having been well washed, it is allowed to dry (if necessary, applying a gentle artificial heat). Should the collodion be of a very adhesive quality, it is sometimes essential, before drying the picture, to immerse it for two or three seconds in a bath of very dilute nitric acid.

The picture thus taken is subject to the improved process for removing or transferring the film from the glass. Having first ascertained that it is perfectly dry, the inventor proceeds to color it (if intended to be colored) at the back, or on the film itself, in the following manner, employing oil, or varnish, or well-sized water-colors:—The picture is tinted according to taste; and when dry, the whole is covered with any colored varnish, according to the general tint wished to be produced. If it is not desired to color the picture whilst on the glass, it is covered at once with varnish, the components of which are asphaltum or Brunswick black dissolved in mineral naphtha to about the consistency of cream. Its tone may be varied by the introduction of warmer or cooler color, according to taste, when the varnish is sufficiently dry, which may be proved by the finger detecting no stickiness. It is not desirable to let it dry beyond this point, least it should crack; but in case further operations should be suspended for a time, to avoid cracking, the varnish must be coated with a thin solution of shellac, which will prevent further hardening of the varnish. The next proceedingly is to remove the film from the glass, and having prepared a mucilage—composed, by preference, of gum-arabic and honey, in the proportion of two-thirds of the former to one-third of the latter—the patentee covers the varnish with this mucilage (in case it be paper employed for the transfer, it may be necessary to damp it first, and then coat it with the same mucilage), after which he attaches the paper or other flexible material to the back of the picture. An even adhesion of the surfaces is effected by clamping the edge between two pieces of wood jointed together, and rolling out the air bubles with a simple apparatus, consisting of a piece of thick india-rubber tubing slipped tightly over an ordinary ruler. When the transfer is to be taken upon wood, stone, or other non-flexible substances, care must be taken that the surface be perfectly smooth; and the air bubles may be excluded by applying one end of the picture first and gradually sliding it on. When the mucilage is dry enough—which may be ascertained by raising or bending back one corner of the picture, upon which, if sufficiently dry, the film should begin to seperate itself from the glass—the time has arrived for completing its removal. By means of a feather, a few drops of water or spirits of wine are now introduced between the edge of the picture and the glass, and at the same time, the separation is gradually effected.

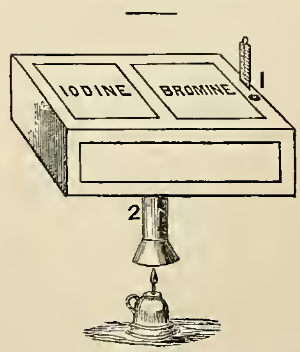
The transfer is now complete; and when it is desired to color it or get rid of the iridescence that will be perceptible upon it, a little magilp, or varnish, or oil, or any other softening matter that will not injure the delicate surface, is rubbed over it with a pellet of cotton wool so as to leave a slight stickiness, to which the dry colors known as "Mansion's," and many other dry colors, will adhere; and in some instances, omitting this last operation, water, oil, or varnish colors may be employed. The picture is now complete.

By the same means the transfer from a plate or glass of a plain film of collodion or albumen on to any suitable base, such as a sheet of paper, or linen, wood or ivory, may be affected.

For the Photographic & Fine Art Journal.

COATING BOX HEATER.

BY JOHN F. HAMILTON.



The above cut represents a box made of tin for the purpose of heating the coating boxes in cold weather. The places marked *iodine* and *bromine* are made just the size of the coating boxes, and as deep as they will allow. All round the boxes is a margin $1\frac{1}{2}$ inches, which is hollow, under the bottom also; so that water poured in at 1 will go through every part of the tin box and run down into the tube 2, which is soldered in the bottom of the box. At No. 1 a thermometer is inserted into the water to ascertain the temperature. By applying a spirit lamp at 2, the water gets warm very gradually and uniformly,

and thereby warms the boxes. Of a cold day it will take an hour to an hour and a half to heat the water up to 70°. If the lamp is then put out, the water cools so slowly that it will not fall 10° in several hours. No. 2 is a tube about a foot in length.

NOMENCLATURE OF PICTORIAL ART.*

BY J. B. PYNE.

THE BEAU-IDEAL.

If this subject be approached through the web of contradictory opinion, which entangles rather than illustrates it, or through those more subtle complicated disquisitions which attempt to obliterate all primary and common-sense appreciation of things in the gloom of a logical negation, it were hopeless, in any limited space, to attempt a disentanglement.

For the Art-loving world it is unfortunate, and for the Art-student more so, that the beau-ideal should remain a vexed question. The world, in general, is the more fortunate of the two, for throwing aside doubt and disquisition, and refusing to complicate a subject of apparently the utmost simplicity, it at once saves its time, avoids trouble, and enjoys its beauty; lives in happiness and dies under the full persuasion that though deformity may occasionally obtrude itself on the attention, beauty may always be had for the searching, and whose beau-ideal is a reality exactly commensurate with its experience.

With the student it is quite otherwise. His aspirations push him continually onwards. His experience should extend to the ultimate experience, and his productions be transcendental.

If the world is perfectly agreed as to the existence of beauty, and its climax in the bean-ideal, readily assenting to it when discoverable in works, and only disputing as to its degree, it is sufficient. Less knowledge would not decrease its happiness, and more might not augment it. The enthusiastic student however may not in commencing his artistic career be satisfied with this state of things. They are not sufficient for his purpose, which is ever onward, deriving sustenance on his route from all sources; at first indiscriminately and wildly, and followed by many derangements of his mental digestion.

There is then much unassimilable reading matter to be waded through on the subject in hand; sufficient, indeed, to try the strength of the finest mental digestion, to swerve a taste of originally pure and correct bias, and warp a judgment from its first fresh healthy and vigorous conclusions.

One theory contends for the actual separate existence in the eternal order of things of such qualities as beauty and deformity.

Another denies altogether the actual existence of beauty and deformity as distinct and separate qualities, and would attribute the perception of them to association alone.

A third theory—a kind of "juste milieu" between the irreconcilable antagonism of the first two—admitting the actual separate existence of beauty, would account for its presence by an universally accompanying fitness: a fitness of parts with a whole, and a whole with external conditions.

There may possibly be other links or grades of opinion serving to bring more closely together these three great salient points, but as they may not be able to extend the subject on either one side or the other, so they could not open up new ground for reflection; but as they are, must be considered to embrace the whole field of opinion upon which the war about beauty has been and will have to be contested.

Nor should a man be vain enough to imagine that with a dash of the pen or the best arranged discourse he might be able to settle the question. If it were an affair of numbers, weight, or measurement, of color, of force, of solidity or liquidity, it had been settled long ago. If it were a matter of commercial or productive import, the want of which should be felt by the million, with a profit of twopence-halfpenny a yard or a penny a pound, obscurity had vanished almost before it were felt to be obscure.—But as it is a matter wide a-field of these things, felt only as a want by the few instead of the millions, in an age far in advance of the age of animal wants and the actual necessities, it must still wait its solution. We have arrived at the age of luxury, it must perhaps wait its final solution in an age of refinement.

It may be questionable, then, "why write," "why discourse," and it can only be answered that to do both one and the other are instances of the purest natural egotism, in wich the speaker or writer would register himself in his opinions; addressing himself virtually to his peers though ostensibly to the whole world. He does so by way of advertisement for the discovery of a mental relative with whom he may well sift a subject in which both may be equally interested. And these stray lines are thrown together as much so arrive at self-assurance as to the soundness of his own views as with any idea of being able to seriously influence any preconceived theory of his fellows.

There are many considerations which involve the improbability that the principles connected with beauty and the beau-ideal will yet be solved, or if solved be generally acknowledged.

Some works possessing the beau-ideal to a great extent have however been produced, and many more still which have an undisputed title to the beautiful, both intensely appreciated; the one attributed to fine taste and knowledge, and the other to a divine inspiration: and the latter flattering though vague and unsubstantial reception will continue to be given to all works of rare elevation of thought, though they may be—like all the present known instances of the beau-ideal—derivable entirely from a high type of Nature itself.

The position of this bean-ideal, standing isolated at the very head of human form, and illustrating what may be considered to be the Creator's first design as to its highest possibilities, throws it far in advance of the wants that agitate the mind of a people, and hence the obscurity that involves the subject, the wonder at its occasional production, and the flattering inapplicability of the language resorted to in its description.

But before losing sight of the subject in premature digression, though without entering into a full disquisition, for which there is no space, it were well to canvas slightly those opinions, already stated as dividing the attention of the student regarding the material separate existence of beauty and deformity. As without this material existence the fight is comparatively for a shadow, but with it, for a glorious reality, worthy alike the consideration of the Art-lover, the statesman, and the philosopher.

To clear the ground of all rubbish and impediments that obscure a fair view of the object in question, and to render it open to the gradual advance of common sense and simple reason, it will be necessary at once to discard from the mind every notion of those sublime logical absurdities, those curiosities in the perversion of language that would deny existence to those things of whose presence every sense vouchsafed to man attests the actual identity; to receive at once those things as real, to whose reality the senses testify.

Thus, then, I think it necessary at once to accept the first proposition mentioned, which asserts "the actual separate existence in the eternal order of things, of the qualities of beauty and deformity," taking deformity in the sense of the ugly, and in which sense it will always be used in this paper. If there be allowed any point of dispute on such a subject, let it merely be the "why such beauty," and the "wherefore such deformity," and not as to the actuality of either one or the other. Without this fair starting-post the race is for nothing, the runners fools, A No. 1. The umpires humbugs, with themselves only for a concourse, and a sham triumph of emptiness. Asserting broadly what is beauty, under the shelter of a definition of the character of the extinct school, it is that which is furthest removed from what is universally allowed to be deformity; and *vice versâ* with deformity. But there is no need of such a definition except by way of general summary, its constituents being tolerably well determined in the general mind.

* Continued from page 240, vol. viii.

In form it would be defined to be the greatest possible amount of variety dominated by harmony, which again would be defined as relationship and opposition with subordination. As regards its variety, not that sudden hectic and wild dissimilarity of parts that would contain the longest with the shortest, the roundest with the flattest, the most pointed with the indented, but a variety founded on affinitities, the culminating illustration of which may nowhere be found in an equal degree with the form of Man himself, who displays, both in structure and movement, a category of all the varieties of form distributed, in a less degree, through all other objects in nature.

The best collateral evidence of this constituency of beauty may be had in the comparison of some of these other less beautifully developed objects in nature, objects of a less complicated structure with a less number of parts; as constituting, by their greater simplicity, a more easily to be determined character.

The second theory, which "denies altogether the actual separate existence of beauty and deformity as distinct and separate qualities, and would attribute their perception to association alone," can hardly be disposed of in so summary a manner as the first. An artist cannot do so; his business is with life and reality, and it is as much as may be expected of him if, in the liberality of his temperament, he may be able to attribute to fair and just motives the attempt to disintegrate from the actualities of nature, some of its noblest and most beautiful identities. It is as much as may be required of him if, in due consideration for the egotism of a professional obliquity, he excuse a man whose business may be writing alone (and which business of writing allows of an impalpable subject for illustration), for a proneness to make most things impalpable, ideal and associative, but he cannot be expected to go further, nor pin his faith to so slender a tissue. Neither need he throw down his familiar instruments, whether they be pencil or chisel, and assume the stranger pen to confute theories which would assume to weaken the appeals of his pursuit to the human mind. He may cut down such theories with the chisel, or paint them out with the brush. He may perhaps do either one or the other more easily than write them down. An artist would, by way of argument, most readily allow of the infancy of Art altogether, from its noblest achievements to its humblest. And if logical precision or cunning be capable in the present state of the science of ignoring an universally acknowledged indentity, it is rather a proof of the possible infancy also of logic itself, or of language, than of the destruction of such an identity, which must still remain an identity intact in the mind, from a more than faith superinduced by the senses. In the present instance such a more than faith does not in any way necessitate the entire absence of association, which may have its full play in augmenting a secondary class of beauty, any more than the smell of a kitchen may be able to realise a first-class dinner, or the effects of one.

But throwing aside this mischievous misuse of logic, the science by itself may be allowed to be perfect; and if limited in its application to subjects of utility, one of the utmost importance to be preserved in its utmost integrity. Logic however has its limits as clearly marked as any other science; for instance, it is not strictly of an initiative character, and follows rather than leads. It cannot go far enough to grasp with first causes, but must wait for previously acquired knowledge upon which to work out its searching precision: its province is in secondary causes, and is powerless when attempted to be carried further. Its only further power is one of a more curious and negative class than otherwise. It is capable of curbing the too arrogant and speculative mind, and defying it to prove to a demonstration that of which it has not previously acquired the true knowledge, and in this regard has its uses.

The human mind, however, being of an essentially initiative character, will no more be content to rest satisfied under the knowledge of secondary causes, than a colony may be content to rest satisfied with anything less than the possession of the whole of a continent.

Under the far-strained and perverted powers of logic, one is denied the right of proving the existence of man. Man's existence a negation, beauty resolves itself into a nonentity, and there remains you may say—in an equally fair mode of reasoning—nothing but the logician himself accompanied by his perversity. But the logician himself thus remaining is by the process identified, and becomes a nucleus around which other existence may establish themselves, and amongst them perhaps even beauty.

Logic is the arithmetic of language, and a very complete one; the accounts in which it is used are kept by double entry, and bear a balance on their face of *all we know*; but at the same time it does not represent the *all we have*, for which we are indebted to a more comprehensive and liberal process. The more purely initiative intellect of the world, in the use of this more comprehensive process, is at work far away beyond the trodden paths, laboring with untired courage and daring on the very verge of that darkened abyss which separates the known from the unknown. One ventures into space and brings back a star, another acquires a continent, a third an art, the last of which importations, in its present form, that of photography, is enriching and entertaining the world with pictures which produced in a single instant, require the strongest microscopic powers to thoroughly develope, and any amount of time to thoroughly examine.

Form itself appreciated under the terms of the second theory denying "the actual separate existence of beauty and deformity," would be an instance of the reproduction of that dark abyss which separates the known from the unknown, the dispersal of which is grandly shadowed forth as the first act of Omnipotent creation; and a mind incapable of seeing throughout the whole universe of form, anything of sufficient intelligence to rank itself at once at the head of all such antagonistic qualities, as grandeur, simplicity; beauty, deformity; strength, weakness; harmony and discord; must be in itself a stagnant well of darkness, of doubt, and of deformity: one constituted on the experience of four senses, with the crowning glory of vision in abeyance.

In the face of that high and universal presence of intelligent form, rounding as it does the infinite separate existences in nature; as distinct in its minute as in its most colossal modes; it is impossible to force the mind by any act of reason to ignore its intentionality, or to doubt that amongst it—accompanied by proportion—a true beauty exists without the aid of association or egotism, which may—by way of admission only—render an object more beautiful to one individual than another; and even more beautiful at one time than another: the last case entirely depending on the varying degrees of activity or supineness of the same reflective mind at different times.

It should not be a difficult matter in answer to this beauty-denouncing theory, to prove the intelligent character of form by a slight survey of its universality.

The first act of creation was in the substitution of form for chaos, and all its subsequent acts are the addition of so many new forms; proportion itself being nothing more than subdivisional separations of form by other forms, components of the first matter of form.

For as far as the mind is able to possess itself of the knowledge of things as they are, does it become the more impossible to imagine that the Creator—in commencing with form—did not begin with the most essential quality of things, and that had creation—as regards the external world—gone no further, man would not have had to complain of any essential wants. This has been so frequently and so distinctly felt that we frequently hear the opinion, that the unessential color is in effect a proof that the great aim of creation was that of producing the greatest possible amount of variety. This, if to any extent true, appears to be a merely putting the cart before the horse. The self-evident intent of creation would berhaps be more truly given, by stating that creation, in adjusting an infinite number of things to an infinite number of ends and uses, has projected an infinite number of forms admirably adapted to them, and that hence has occurred the infinite variety; so full in itself, that more than satisfying man's wants and expectations, leaves him at a loss to discover the motive for such an apparent waste of form and color, and leads him on a wrong scent in accounting for them.

We find, also, an admirable harmony and genial agreement between the Mosaic account of creation, and what may be called the revelation of geology in the order of that creation. We first find the acts of creation first merging into light and intelligence on the grandest scale, such as in the great globe itself indicated as a mass of waters. "*And the earth was without form and void*; *and darkness was upon the face of the deep. And the spirit of God moved upon the face of the waters.*"

After the rising of the land above the surface of this profound solitude of water, we find creation occupied in calling into existence the simplest and less complicated forms of animal life: proceeding gradually through the more complicated winged tribes, the vegetable, the terrestrial animal, and only, as an ultimate act, producing Man with a completeness and variety such as to offer in itself alone a fair constructive balance to all the rest of creation besides.

The gift of the whole of this previous creation to man is more than an indication of the perfect equilibrium existing between the two. And as fair an indication that, being presented with an even balance-sheet on entering life in the world, he may be required to produce as fair a balance upon leaving it.

If it be still possible to doubt that amongst this infinity of varying form there is included an ultimate beauty that such beauty has always, amongst other qualities, been present in the scheme of the Creator, it is only necessary to contemplate the added infinite variety of color to turn the mind from its doubt, and permanently fasten upon it the more healthy conviction that beauty reigns in different degrees at, and as the head of every definite class of things; and that by comparing classes, and placing that which includes man at the head of all others, *the highest possibilities of the human form realize in its ultimate fulness an instance of the beau-ideal.*

While feeling that every class is capable of maintaining beauty at the head, it is easy to allow that it permits deformity at the base. It would appear that the very nature of things insists on this conclusion. The infinite variety includes infinite difference and separation may not be utility and inutility, as universal fitness and utility are more conspicuously clear and defined in the works of nature than any other quality; that is, they are *universal*, as they never vary, but attach equally to things beautiful as to things deformed. We say a thing must either be more or less ornamental. As this infinite variety and difference does not affect the useful things are all useful but more or less ornamental, and hence *beauty and deformity.*

It is inadmissible to speak of the works of Nature upon the same terms as of the works of Man. Of the latter, it may be said that some are neither useful nor ornamental; and I should therefore say of that theory which would dethrone beauty in the world and place her at alms under the varying caprice of a well-informed or ill-informed associativeness that it is neither useful nor ornamental; but most gratuitously mischievious, as calculated to retain a base mind in its original coldness, and as offering some plausibly philosophic grounds for lowering the generous and grateful warmth of a great one. Though not coming under the strict definition of beautiful, as being imperceptible to vision, there are other qualities applicable by other senses not entirely irrevalent, as thus belonging to the beneficent side of the nature, and having consequently a certain amount of affinity with the beautiful. Textural smoothness, elasticity, softness, and warmth, have all their value in the heightening the impression of an appreciated beauty.

Reasoning on the constitution of the mind, and the several causes contributing more immediately to the development of its various sentiments, feelings, and passion, we find that it would never ascend to so high a one as love without the presence of beauty. And by analogy, on the general scheme of creation, in which nothing is left undone which tends to high purpose, we must admit at once that the world is wondrously full of beauty. Some will say that certain minds are so full of love that they include the whole world as the object of this passion. But it would, perhaps, be safer, in this instance, to call this passion feeling, and pronounce this feeling benevolence, as, is tested severely, it would be found to fall far short of that passion which absorbs all other modes of light in its effulgence. It will be therefore safe to conclude that, as creation had so universally elaborated the susceptibility to this passion, it has been no less liberal in the distribution of its most essential aliment—under the numerous forms of beauty—for its eternal sustension.

Thus the mind, while instinctively but unconsciously weighing the different gifts of creation, will be found as unresistingly possessed by the following feelings: gradually ascending with the gradually extending benefits; commencing with the simplest contentment in return for the mere privilege of life and wherewithall to live, and grandly terminating in veneration of the Creator for that extension of the boon in which the mind finds itself still better provided for than the body.

Thus, uncivilised man in the possession of the merely necessary, remains *contented,*—with the useful, he becomes *grateful* ; the arts, science, and luxury excite his *admiration* ; beauty and refinement, his *love ;* and under a true appreciation of the essence of Deity, in which his own mind expands with his gradually expanding knowledge, his soul fuses in *veneration.*

To be Continued.

From the Jour. of the Phot. Soc.

PHOTOGRAPHIC NOTES.

ON THE APPLICATION OF PHOTOGRAPHY TO THE COPYING OF ANCIENT DOCUMENTS, &c.

An abstract of Dr. Diamond's valuable letter to 'Notes and Queries' on the above subject, will doubtless, be interesting. He states, that he has turned his attention to this branch of the art for some years with perfect success, and recommends the following treatment as the result of his experience. An old mixture of collodion originally made sensitive with a compound of iodide and bromide of ammonium is best; but any old collodion is to be preferred to newly mixed. A light object (such as the page of an ordinary book), half size, if a single lens is used with an ordinary diaphragm, is to be exposed about 3 minutes; full size, 12 or 15 minutes; A double combination lens takes only half the time but should be much stopped with a diaphragm. The picture is to be developed as usual with a weak solution of pyrogallic acid freely dashed over the surface. After cleaning the picture *perfectly* from the hypo, a mixture should be passed over it composed of 2 drachms of bichloride of mercury and 2 drachms of chloride of ammonia, dissolved in 10 oz. of common water. The picture now assumes a bluish tint. Wash it quickly and thoroughly, and pour over it at once a solution of hyposulphite of soda, 5 grains to the ounce of water. This produces a most intense black, and the negative, being washed and varnished, is finished and permanent. The Doctor concludes by affirming that this process is applicable to the production of photographic copies not merely of MSS. on vellum and paper, but of engravings, medals, seals, oil paintings, and all similar objects; and the beautiful specimens he produces in support of his assertion are most convincing and satisfactory.

NEW METHOD OF COPYING PAINTINGS.

Sir,—As numerous discussions have recently occurred upon this most important subject, I am inclined to think the following method, which I adopt for copying complicated subjects, such as illuminated manuscripts or water colors, may not be considered unworthy the attention of photographers; if you agree with me, and think it deserving of a space in the Journal, you are welcome to publish it.

Expose a plate to photogenic action, collodion side reversed from general practice, that is, so that the rays pass *through* the glass plate to get on to the collodion; then fix and dry, it is not always necessary to varnish, it is only to act the part of a screen to the negative proper, which should be albumen paper, or dry

collodion*, as it must come in contact with the pictnre on the screen plate when placed in the camera to obtain the perfect negative

All the photographers will see the use of the screen plate, viz. to entirely exclude from the negative proper the photogenic rays proceeding from the blues, whites, and other excessively sensitive parts, and to proportionately admit them to the less sensitive portions. Of course no rule can be given as to the best time to remove the screen plate, that depending npon what is to be copied, and many other circumstances. How long the negative proper is to be exposed to full action after the removal of the screen plate, is a question equally difficult to answer. Another important, most important, query, is the best way to place and remove the screen plate, and this must depend upon the ingenuity of the operator and manufacturers of the apparatns.

I am, Sir, yours obediently,

S. W. Bultz.

* I say "albumen, paper or dry collodion," having used the screen plate in contact with the other plate, but I think it not impossible to use the screen plate midway between the lens and the negative proper.

ON THE PRESERVATION OF PHOTOGRAPHIC PICTURES.

Sir,—I have been led to adopt a method of treating paper positives which may, I think, tend greatly to their preservation. The process has been used for some time in Rome, and all the evidence I possess confirms my opinion of its merits. Dissolve by heat, as mnch white wax as will make 2 oz.; add 2 oz. of common turpentine, stir the mixture well: it will cool to the consistency of paste. Spread this evenly with a brnsh over the photograph, and rub it in with a piece of flannel, hang it up for six or twelve hours in a warm room, then brush it with a hard brush to polish it. The smell of the turpentine will be lost in a day or two. The appearance of *both plain and albuminized paper* is improved by this process.

I am Sir, yonr obedient servant,

Robert Howlett.

FIXING BY CHLORIDE OF PLATINUM.

Sir,—The subject of a communication that I was about to make to you, I find has been taken up by a French gentleman; I allude to the substitution of platinum for gold, in fixing and coloring positive proofs upon paper.

A few months ago, in endeavoring to discover a substitute for the expensive chloride of gold, I tried the platinum salt with every success, but gave it up on account of its very slow action compared with gold in the way I used it. A few remarks upon it, however, may not be uninteresting to your numerous readers, some of whom may perhaps be induced to experimentalize further in this, I think, very promising direction. I have not tried the process of M. de Caranza, as the immense overprinting, and subsequent redncing of the proof, recommended by him, would, in my opinion, be an infinite set-off against any advantages arising from the use of platium. The best method I have tried, is to salt, sensitize, and print the paper in the usnal manner; I prefer Mr. Shadbolt's process; wash away the free nitrate of silver, first by floating on cold water, and then by immersion in hot and place in a bath composed as follows:—

Dissolve 30 grs. of hyposulphite of soda in 15 ozs. of water, and add 10 grs of chloride of platinum, containing free hydrochloric acid, dissolved in 5 ozs. of water.

Any color between a brown and a purple black can be obtained; it is then to be placed in a hypo bath, 3 ozs. to the pint; the print has a much greater fixity in this bath, than when colored with gold; the color does not change in the least after three hour's immersion. After washing in a little hot water, I think the permanence of the proofs will not be surpassed.

I am, Sir, yours obediently,

Edward C. Cortis.

THE OXYMEL PROCESS.

Penllergare, April, 3, 1856.

In conseqnence of some promising experiments which I made with glycerine in the autumn of last year, I ventured to call the attention of my brother photographers, in the December number of the Journal, to the use of that substance. Since that time I have prosecuted my experiments with regularity, but without being able to perfect any formula which I could recommend with due confidence for general adoption. In the conrse of my researches I made trial, for the sake of comparison, of all the different methods that have been recommended for the preservation of excited collodion plates, and in doing this I discovered a modification of Mr. Shadbolt's honey process, which, in simplicity of manipulation and certainty of result, appears to fulfil all the conditions that photographers are in search of. I am still of opinion that glycerine will eventually prove a valuable aid in photography, although, in my hands, its use is not yet perfected; while the oxymel* process which I am about to describe gives results so uniform and so good, that I am desirous of publishing it before the season for photographic work has arrived.

By delaying I might perhaps give more certain information as to the limit of time to which plates may be kept, and some other particulars which require leisure for other investigation, but the time for work is now fast approaching, and to delay the communication is to lose a year.

My method of proceeding is to prepare the collodion plate in the nsual way, and when taken from the nitrate bath, to immerse it in water in a gutta-percha tray for two or three minutes; pour away this first water, and wash again with a fresh supply, so as thoroughly to remove all traces of free nitrate of silver; on removal from this second washing bath, drain pretty closely, and immerse again in a filtered bath, composed of 1 part of oxymel to 4 parts of water. This preservative solution should be placed in a horizontal gutta-percha tray, similar to that used in the water bath; it should be tilted up at one end; the plate, collodion side upwards, is to be placed in this, and when the tray is restored to the level, the syrup will run with an even wave over the sensitive film, and may remain covering it for about a minute; then tilt the tray again, raise the plate evenly, and place it to drain on a piece of clean blotting-paper, which should be renewed after the lapse of a few minutes.

By this method a film of perfect smoothness is insured, and the difficnlty of ponring the syrup evenly over the plate is obviated.

I have not yet practised this process sufficiently to know how long the oxymel bath will remain good; but as the free nitrate of silver has been previously washed away from the surface of the plate, I see no reason why it should deteriorate; and I have found no ill effect arise from its continued use. Even, however, if it should reqnire frequent change, it is prepared in a few minutes, and at the cost of a very few pence.

The time for exposure in the camera is, I believe, about double that of any ordinary collodion plate.

To develope, it is necessary to wash it in water for four or five minutes, and then pour on pyrogallic acid, of the usual strength and in the usual manner, adding previousfy 2 or 3 drops of the silver bath. The development proceeds rapidly under this treatment, and may be carried to the fnll intensity of the best negatives.

The process only involves the necessity for two additional gutta-percha trays, and is extremely easy in all parts of its management.

I can recommend it with great confidence, as the best method among the many that I have tried; and indeed I find it fulfils all the conditions which are required for field work in the production of photographic landscapes, when at a distance from the laboratory or the tent.

J. D. Llewelyn.

* Oxymel is a substance kept by all druggists, and is a syrup composed of vinegar and honey.

From the Jour. of the Phot. Soc.

WHAT PROCESS IS BEST SUITED TO A HOT CLIMATE?

St. Vincent, West Indies, March, 1856.

To the Editor of the Photographic Journal:

Sir,—I shall esteem it a very great favor if you will recommend to me what your experience, or that of others, points out to be the best and easiest process for a tropical climate; where from the heat and very powerful light, there is much difficulty in keeping paper, when iodized or sensitized, or collodion, or the iodizing compound, and much annoyance is experience from rapid solarization, and the over-exposure of a few seconds.

I have used How's modification of Le Grey's waxed-paper process with partial success; but the paper when waxed soon becomes brown and spotted, and I am obliged to prepare but a few sheets at a time, as they spoil, and the iodizing solution, however carefully kept, becomes bad very soon.

I have tried Townsend's process, but failed from large blotches (yellow) on the paper, caused, I suspect, by the heat acting on the wax; but I shall try it on unwaxed paper, and then wax.

I have seen Dr. Mansell's formula for "seaside Calotypes" in *Notes and Quieries*, and it seems applicable to this climate; but here, where chemicals are not to be procured, and those from England, if they arrive in good order, will not keep, it is vexatious and annoying to find from failures what will *not* suit, when the experience of others may set you right; but there are no photographers out here, and so I apply to you.

As to dry collodion, and Mr. Sutton's Colotype process, tent-work is simply suffocation; and the injenious Mr. Sutton would find his india-rubber cloth melt in this heat, and his yellow calico useless in houses where the rooms are large, and are, in fact, all windows, or rather *jalousies*, admitting the light at every "pore."

This is all the more annoying, as the scenery is magnificent; and, although its great charm is its foliage, which prints but a confused mass, still in all the ravines, and along the river-courses there are "bits" which you regret that the disadvantages an unskilful photographer labors under prevents your taking.

The desideratum appears to be a process in which the materials used are little affected by heat.

I am, Sir, yours very obediently,

"An over-exposed Indian."

UPON THE WEIGHTS AND MEASURES USED BY PHOTOGRAPHERS.

To the Editor of the Photographic Journal:

Sir.—A few days since I had submitted to me two formulæ for solution to be used in photography, and the question was asked, " What division of quantities am I to understand is here intended, for here are pounds, ounces, pennyweights, scruples, drops, pints; am I to take avoirdupois or troy weight, 16 or 20 ounces to the pint?" I was at a loss to give the required information, although I have the various weights and measures at my 'fingers' ends,' for there was such a mixture of avoirdupois, troy, and apothecaries' weights, and I knew that the troy pound of 12 ounces is scarcely acknowledged, and that wine measure is better known than imperial, the ordinary wine-bottle of 24 ounces being called a pint and a half, and the common 8-ounce medicine bottle, half a pint.

I do not doubt but many of your readers have been misled, disappointed, and put to useless expence by the uncertainty which arises from the present mode of denoting quantities; for example, a person buys one ounce of nitrate of silver and expects he has 480 grains, but, weighing it again, he finds he has only 437½ grains; which, had he used it for a bath without weighing again, would have been 42½ grains weaker than required. In absence of an established decimal-system, I propose that all quantities by weight be denoted by grains; thus, instead of writing 2 drachms and 2 seruples, or 13 pennyweights and 4 grains, I would say 160 grains or 437½ grains, whichever ounce, troy or avoirdupois, is intended; and to prevent the trouble of caculating the amount of grains in the various weights at present in use, I would obtain or construct for myself weights corresponding to 100, 200, 500 and 1000 grains; these, in addition to the small weights now in use, viz. 60, 40, 30, 20, 10, grains, and a comparative table of weights (which, if approved of, I shall be happy to send you), would form a system of weights which would ensure correctness and prevent error and confusion.

Measures of fluidity I would express in ounces, drachms, and mimins, as the graduated glass measures are generally correct.

Measurement by drops can never be correct, as I have found by repeated experiment that a drop is often as large, if not larger, than one from a 40-ounce bottle: the usual 1-drachm measure is graduated down to 5 mimiums; and if less quantity than that be required, I think, for the sake of accuracy, it is better to dilute the article and *measure* a proportional quantity.

I am sure that every one engaged in the pursuit of science must be anxious for the adoption of a uniform system of weights and measures, and until this is obtained I do not think photographers can err in using the above proposed system.

John Astley.

ON THE USE OF ALUM.

Sir,—Having been requested by Sir W. J. Newton, in conversation which I have lately held with him on the use of *alum* as a fixing agent, to state my views more at length in the pages of your Journal, I have much pleasure in doing so.

The object he assigns for the employment of the alum is to remove the last traces of hyposulphite of soda left in the paper after a certain amount of washing in water, insufficient for the complete cleansing of the proof. This it does by *decomposing* the hyposulphite in the same manner as an *acid* or an acid salt will always do, viz., by combining with the soda and liberating the unstable hyposulphurous acid, which then passes into sulphurous acid, and sulphur, thus causing a milkiness and subsequent deposit in the liquid.

The liberated sulphur tends to combine with the print, darkening its color ; and hence alum which Sir William employs is dilute, and when he developes upon *iodide* of silver, the proofs do not appear to undergo any sulphuration. I have found, however, that his bromide of silver proofs *are* darkened in color, and consequently less stable than they would otherwise have been.

The impressions sent to me for the Society's Exhibition were less affected by sulphuretting and oxidizing agents than any others which I tried ; they were developed upon a mixture of iodide and bromide dissolved in serum of milk; and had passed through the alum bath, thus proving that the iodide-developed prints will bear the alum of the strength employed by Sir William. In this case there was no toning effect, the tint of the proofs being red or brown.

I confess I am at issue with Sir William upon this point. Alum cannot, I think, be considered admissible in the majority of printing processes, and it seems to me that it would be better to remove the hyposulphite of soda by washing in hot water, than to adopt the plan of decomposing it with an acid salt, thus leaving *sulphur* in the fibres of the paper.

I am, Sir, Yours most truly,

F. Hardwich.

Personal & Art Intelligence.

The *Ambrotype* question is daily becoming more and more interesting, as new facts are developed. Our remarks in our last issue have called forth the following additional evidence in regard to the originality in the use of balsam of fir for photographic purposes, as claimed by the patent. This letter, together with the evidence of Mr. Perry, seems to knock away the only prop by which the Ambrotype patent could have been sustained. We have been further informed, that the term "*Ambrotype*" was not original with the patentee; but was suggested to him by Mr. Root, of Philadelphia. While on this subject, we must reply to several allegations that have been made against us, in consequence of the position we have assumed in regard to this patent. We therefore wish it distinctly under-

stood, that we never have had any cause for opposing Mr. Cutting, except in the belief that he was not justly entitled to a patent in the use of bromides in his positive process,—and it was on this ground only, that we at first became inimicable to his interest,—but subsequent investigation convinced us also that he was mistaken in thinking himself the originator of the use of balsam in sealing two glasses together in the manner specified in his patent; and we think the letter of Mr. Langenheim settles that point conclusively. In all our personal relations, Mr. Cutting has always observed towards us a demeanor perfectly gentlemanly and friendly, and we have no other feeling towards him; and we are convinced that Mr. Cutting can look upon our course, in respect to his patents, and in all other matters concerning the Photographic Art, as that of an impartial journalist.

We have only to be convinced that a man has really and truly *invented* a new process, or instrument, or improved in any way any formulæ used in photography, to give him our cordial assistance in furthering whatever views he may entertain as to its disposition. We believe that a man is entitled—when so disposed—to reap whatever benefit can be derived from the fruits of his brain; and under such circumstances, he can always command our support. But, on the contrary, we shall as cordially oppose alledged improvements, that we feel convinced are not the property of those claiming them. If our past course as editor of this Journal has not already convinced the photographic community that that is our principle of action, we now give them to understand that they need look for no other.

Another rumor we wish to correct. It has been stated that our opposition to the Cutting patent, has been purchased by Messrs. Brady, Gurney, and others of New York—and at what a price! $25! We have heretofore thought the rumor too ridiculous to notice, but as it seems to have gained ground lately, we give it this passing puff. We might take another course if we knew the originator to be responsible. As it is, he had better patent it.

188 *Chestnut street, Phila., May* 8, 1856.

Dear Sir:—As I find my name mentioned in your valuable Journal of last month, in regard to the Cutting Patent for putting up pictures between two glasses and the application of Balsam of fir, and as you very properly take an interest in the soundness of said patent, I have thought it my duty to state to you what I know of the previous application of this now pretended method. Here are the facts:—

In 1846–7, being engaged in the getting up of an exhibition of pictures on glass by means of the hydro-oxygen apparatus, and being desirous to protect the valuable pictures from injury, I spoke to Professor (?) Grant, then resident in Philadelphia, but now for many years located in New York city, of my desire, and he a short time afterwards told me that he had discovered a method of covering the picture side with balsam of fir, and putting a second glass on top of the balsam. He told me at the same time that he had avoided the difficulty to enclose air-bubbles between the glasses when being put together, by means of an air-pump. He also showed me some specimens done in the above manner. At the time he told me his method, in the winter of 1846–7, I had no more need myself for Grant's method, and besides a few experiments, I did not use his process; but I know that he used it for his own pictures, of which he had a collection at that time.

You will be able to ascertain Professor Grant's abode in New York, as he is well known in connexion with several hydro-oxygen-gas-light experiments for *lighting* lighthouses, locomotives, etc., and has given several lectures in your city on that subject. Professor Grant will be able to tell you all about it. I do not recollect now any of Mr. Perry's balsam pictures as you mentioned in your Journal; it may be, however, that he alludes to my brother, W. L.

Hoping that the above lines will find you in good health.

I remain, yours, very truly,

F. Langenheim

—H. Wadworth.—The specimen daguerreotype sent to Mr. Anthony, appears to be well enamelled, and we have given it pretty hard usage to test its permanence; but as there have been many preparations made for the same purpose with apparent similar results, which have been abandoned after fair trials, it would be impossible to give any opinion as to the value of your particular application, without knowing more of its nature. Like all other applications of this nature, it seems to destroy the roundness of the picture, and increase that disagreeable glare which is now considered the only defect of the daguerreotype. We want processes that will not only be effectual in preserving the picture, but in destroying the glassy reflection of the plate. When this is accomplished, the daguerreotype will again be in the ascendant in the affections of the people, for in every other respect it is superior to the ambrotype.

—F. White.—This gentleman proposes to issue a series of Photographic views, illustrative of New Hampshire scenery. A copy of the first of the series we have seen, and we take pleasure in saying that it is a very excellent and artistic picture. We have no doubt the views will have quite an extensive sale, for in no way can the lovers of the wild romantic scenery of New Hampshire obtain so truthful representations. Mr. White's advertisement will be found on our cover. Gentlemen wishing to subscribe can send their names to this office.

—Our friend, W. C. North, of Mansfield, Ohio, sends us the following notices of a new method of coloring ambrotypes, in regard to which he writes in a very sanguine and confident manner. Mr. North says:

"This discovery of Mr. Willoughby, will doubtless come into general use; the colors are applied to the *negative* side, almost indiscriminately, and on the *positive* side you view it as nature's own mysterious handiwork, the resources being furnished by man; and any man who would try to improve nature, would indeed be a fanatic. Any color can be produced, and the picture is rendered more durable and perfect in every respect. While I was at Findlay, Mr. W. had an offer of $3000 for the city of Philadelphia; as two other gentlemen were negotiating for *all* of Pennsylvania, he could not give a positive answer until some time *this* week. I could give you a long list of his sales, if time and space would permit. I will merely add that he has disposed of Georgia, Kentuckey, Tennessee, Iowa, California (California good as sold), Maryland, Pennsylvania, and Ohio. Ohio is mostly in the hands of agents, New York State is for sale. I am desirous of bringing this fact before the readers of your valuable journal, and knowing that you wish to be informed of all new and valuable improvements in our beautiful Art, I have taken this method of bringing it to your notice; perhaps you have already seen notices of it in the press. Any information wanted on the subject, can be procured by either addressing Mr. Willoughby or myself, by mail or in person."

I remain, yours, respectfully,

Walter C. North.

The following is from the Mansfield paper:

"For several years past, Daguerrean Artists have been endeavoring to discover some process by which to daguerreotype objects with all their colors. This result we have every reason to believe, has finally been accomplished by a Mr. Willoughby, of Finlay, Ohio.

"W. C. North of our city (a connoisseur in matters of this kind), has just returned from Finlay, and has brought with him a couple of pictures taken by the new process.

"The Colorotype is, in fact, the Ambrotype, so colored as to present the exact appearance of being taken through the camera, with all the natural colors of the original. Any color can be produced, and the picture is improved in every respect; the sitter remaining only a few minutes longer to have his picture completed. It does not require a regular trained artist to color the pictures. The colors are applied in such solutions and oils, as to render the picture more durable and perfect.

"Mr North is fully satisfied of the entire success of Mr. Willoughby's discovery.

"Mr. W. has applied for letters patent which doubtless will be granted.

"Mr. W. has already diposed of the right for several States, and is besieged with applications for others."

The (Finlay) *Home Companion* speaking of Mr. Willoughby's discovery, says—

"We learn that Mr. A. P. Willoughby of this place, has made a valuable discovery in the photographic art, from which he will, doubtless, realize a handsome fortune. The discovery, we believe, consists in a process of painting Ambrotype pictures, in such a way, that the natural expression, color of the hair, eyes, cheeks, &c., is brought out although the paint is applied indiscriminately. Mr. Willoughby has just returned from Washington, where he has been to apply for letters patent for all the Territory of the United States, some of which he has already disposed of at a handsome figure. We believe that Mr. W. has found the true alchemy, the philosopher's stone, at last, that will fill his pockets with gold."

We add another notice from the Sandusky City *Register*:—

"Never before as within the past few months, has the art of representing the "human face divine" on glass and metallic plates, received so much attention, and never have improvements been so rapidly made. The following account of a discovery which promises to be of greater value than any hitherto made, we extract from the last number of the Findlay (O.) *Courier*:

"A. P. Willoughby, of this place, has at last discovered the great secret which has been so long sought for by Hill and other distinguished artists, in coloring Ambrotype or Crystalotype impressions, the effect being produced by nature instead of art. The solutions and oil colors are applied on the negative side of the impression, indiscriminately, without regard to artistic skill, nature developing the picture itself. Mr. W. has just returned from Washington City, where he has been for the purpose of securing letters patent. The solutions and oil used are supposed to render the picture imperishable. Should the discovery of Mr. W. prove all that he seems to be fully persuaded it will, it will add very much to the importance of the "life art" which permits us to see the form of the human mould as life drew it, without the presence of the substance. The Washington *Union* gives the discovery a complimentary notice.

"If this discovery should be successful—of which the prospect seems to be very fair—it will bring the art of taking pictures from shadows by the influence of light, to a point of perfection which it will be in vain for steel engravers to hope to excel."

These notices give us a favorable impression of Mr. Willoughby's discovery, and our confidence in Mr. North is such as to induce us to give them a place, although we have seen none of the pictures. We shall be better prepared to speak of them when we do.

— We have received some very fine specimens of photography from Mr. J. M. Ford, of San Francisco, Cal. Mr. Ford informs us that the only instructor he has had has been the *Photographic and Fine Art Journal*—and we may add that he certainly needs no other, for his pictures will compare favorably with those of our eastern photographists.

— Mr. A. Bisbee has shown us some new styles of colored Ambrotypes that have a very pleasing effect. They are admirably executed, and like all his work, both artistically and tastefully arranged. There is great delicacy, minuteness of detail, softness of tone, and roundness of figure in this new style of picture. The outlines, usually harsh in the Ambrotype, are in these pictures—which he calls *Sphereotypes*—very delicately rounded and pleasing—not having that abrupt termination which displeases our eyes in the former.

— H. R. Taylor.—We have every reason to believe that the greatest care is observed in making up the Journal for the mail. With the system pursued in doing so, we do not see how it is possible for any to be missed. We receive so many complaints of the miscarriage of numbers, and we have ascertained such facts as to convince us that our post-office department, throughout the country, contains more thieves than was ever known to exist in it before.

— We are sorry to say to those who have sent us money for Mr. Root's promised book, that there appears no probability of its ever being published. Mr. Root has pursued a course in regard to it, that is, to say the least, very reprehensible, having forfeited his word to us, and placed us in a position not very agreeable. A full history of the affair will be laid before our readers in our next. In the meantime, we will send any other work we publish of the same price in place of it. We shall soon issue a second edition of Hardwick's Chemistry, also Sutton's Calotype Process, and Monkhoven's Collodion Process; either of which will be sent, or we will refund the money, as may be desired.

— American Gallery of Female Beauty.—We learn that this singular and attractive enterprise will certainly open at Barnum's Museum, on the 7th of July next, with about a thousand likenesses of the handsomest ladies in America. The artists all over the Union are on the *qui vive* to send some of their best productions, and each is striving to ascertain if he cannot be the fortunate photographist of the premium picture.

— We should like to have too good negatives of Hon. A. J. Donaldson, American candidate for Vice-President. Can any of our western friends furnish them ?

— We would call attention to G. C. Cannon & Co.'s advertisement. It is worthy the attention of any Daguerrean desirous of moving to the west.

— Messrs. Barnard & Nichols have fitted up a new suit of rooms in Syracuse, and they will hereafter have greater facilities for meeting the demand for their exquisite Photographs. We take the following extract from the *Syracuse Standard*:

"Yesterday we spent a few moments in the new Daguerreotype Rooms of Messrs. Barnard & Nichols, over the Mechanics' Bank, and can scarcely find words to express our admiration of the convenient and elegant arrangement of the rooms, both for operating and displaying the splendid Daguerreotypes, Photographs and Ambrotypes taken by these skilful professors of the Daguerrean Art. The third and fourth stories are occupied entirely by Messrs. Barnard & Nichols. The show room is in the third story, and its walls are adorned with as fine a lot of pictures as can be seen together in the United States. A ladies' toilet room adjoins the show room, provided with everything that could be desired by ladies who wish to give the finishing touch to their charms. A large stock room is in the rear of the show room, and the stock comprises everything necessary for carrying on the business in its greatest perfection. In the upper story two large operating rooms have been constructed, with sky-lights, capable of being arranged to make any degree of shade or color desired. This double arrangement of operating rooms enables them to dispatch business with the utmost celerity, and not keep customers waiting until their patience is exhausted. The instruments and stock of these gentlemen are of the most improved style, and as operators they are second to none. Call and see their rooms and sit for a picture.

— The successful experiments in photographic illustrations of scientific subjects at West Point by Lieut. Gilmore, have induced the U. S. government to supply several departments with photographic apparatus. These apparatus have generally been made expressly for them, by Mr. E. Anthony, of New York, and are fine specimens of masterly workmanship.

— The Ambrotype Manual: *A Practical Treatise on the art of Taking Positive Photographs on Glass, commonly known as Ambrotypes.*—Containing all the various receipts for making collodions; preparation of the nitrate bath; developing solutions; varnishes, &c., &c., as practiced by the most successful operators in the United States. To which is added, The Practice of the Negative Process and of Positive Photographs on Paper. By N. G. Burgess; Practical Photographer, and Manufacturer of Chemicals for the Art. 1 vol. 12 vo., 178 pp., price $1. Daniel Burgess & Co., No. 60 John-street, Publisher. The title of this works fully indicates its purpose. Mr. Burgess has long been engaged in photography, and as a practical worker is excelled by very few if any. He has here produced a work that we can highly recommend as of practical utility.

Mr. Anthony's extensive factories were burnt to the ground on the 30th of April. This temporarily prevented his filling his orders, but he is rapidly overcoming the difficulty, and will soon be enabled to fill all orders with his accustomed promptness. We shall present our readers with a view of the ruins, taken by Mr. Frederick's, in our next

R. A. CARNDEN.

Negative by himself.

From the London Art-Journal.

SUGGESTIONS OF SUBJECT TO THE STUDENT IN ART*

BY AN OLD TRAVELLER.

CHAPTER IV.

The Duties of the Gift d—Poets of the Pen and Pencil—Let her Die!—A last Appeal—The Cathedral of Catania—Fresco of the Sacristy—The Trees of Etna—Groans of the Dying—Effect on Survivors—A Legend of San Giacomo—A Team of old time—The Magician of Antioch—Cyprian, Bishop and Martyr—Santa Christina—A Studio in the New Forest—Go but deep enough!—L'Amphitryon où l'on ne dine pas—The disappointed one!—A Poacher—Grief in the Forest—Woe for our Chums and Gossips—Imperial appreciation of English Art—Street Life in Rome—The Morra—The Cripple of the Scalinata—Roman Children at their Studies—The Battle of Scarston—The Traitor Duke—Gratitude of King Canute—Inkermann—"Spring hath come!"—Song of the Turkish Poet—Lament of a Captive Queen—Dante "Il Purgotorio"—Buonconte of Montefeltro—Spirits of Light and Darkness—The Price of a Tear.

THERE are duties imposed on you by your heaven-sent dower of genius, oh ye, the true-born sons of Art; and one of the most imperative among them is this.—That ye fail not in that binding elause of your mission which eonstitutes you the teachers of all whose pilgrimage of life is appointed to them in a less exalted region of thought and feeling than that reserved for yourselves. It is for *you* to aid us in our efforts after a better understanding of things, and look well to it, lest we, whose hearts are ever open to the profit of such lessons as ye prepare for us, and whose eyes wait trustingly on the work of your hands, should be left still wandering in the gloom of our darkness, because ye haste not to cast around us the bright radiance of that light, which the artist, no less than poet of the pen, has been sent on this lower earth to dispense for our behoof.

Below is a commencement already made by one of the last-named missionaries—made with head fully given to the work, and with heart well attuned to the service. Let us hope that no word of it has been lost, but do *you* eause that which has, as yet, but amended the reader, to beeome the effectual monitor of the thousands who do not read. And not of those alone who lack the ability to do so, but of the crowds whose butterfly days present so fair a sunshine that they cannot choose but pass the whole sum of them in fluttering amidst the beams. For even these are aceessible to the monition of the painter: there idle glance is not refused to the canvass whatever may become of the printed page. A picture! oh, by all means! it is a pleasure the more, and stand aside to let them take a fair look at it, for there may be one among them that shall profit thereby.

To them succeeds a larger, if not so bright a train of spectators; these are they who have not light enough in their dreary experience of that which—for lack of another term—they too call *life* to let them see the beneficient words of the poet, but to you, oh painter, their eyes and hearts are still accessible: see that you do not leave them longer without appeal. Here are the pictures: they are not joyous ones, but they show truth; and what *is*—alas that it should be so! But shall these things continue to be thus? Let your part of protestation against them be done, and when you have spoken to the great heart of the public; when the voice of approval has decreed that your work is of Art's contributions to the well-being of humanity; when, by the beneficient power of the graver, your teachings have been reproduced, till brought to the knowledge of all; then, if you shall hear but of one whose downward step has been arrested by the warning they hold forth, will not your reward be a rich one, and shall not your fellow-laborer, the poet, declare you both to be largely repaid?

It is within the walls of a prison that you find your subject; that hapless girl! The moving words that follow tell you sufficiently what your part in the work must be.

"Name her not, the guilty one!
Virtue turns aside for shame
At the mention of her name:
Very evilly hath she done!
Pity is on her mis-spent;
She was born of guilty kin,
Her life's course has guilty been;
Unto school she never went,
And whate'er she learnt was sin:
Let her die!

"She was nurtured for her fate,
Beautiful she was and vain,
Like a child of sinful Cain,
She was born a reprobate!
Lives like hers the world defile,
Plead not for her, let her die,
As the child of infamy!
Ignorant, and poor, and vile,
Plague-spot to the public eye.
Let her die." †

"Let her die!" But at least let us hear her last appeal—the teacher of the pen has not shrunk from giving it; do not you spare to send it, trumpet-tongued, where the idlest must at least be made to know of its utterance, and cannot plead that "if such things were, they wist it not. Listen to her, that poor wailing outcast; the mandate has gone forth; these early rays of morning—alas, that the sweet sunshine should ever seem out of place—are the last that her eyes shall behold; pass some few short hours, and the narrow cell she kneels in shall be exchanged for a yet narrower abode. But we know whither it is that her last words are ascending and shall they not prevail?

"Let my cry of anguish reach thee,
God of love!"

Amen! and amen!

Hear beside some portion of the lesson to ourselves, which the writer has conveyed in other parts of these sad heart-moanings—thus they commence:

"I am young, alas! so young,
And the world has been my foe,
And by hardship, wrong and woe
Hath my bleeding heart been strung.
There was none, O God! to teach me,
What was wrong and what was right.
I have sinned before thy sight,
Let my cry of anguish reach thee,
Piercing through the glooms of night,
God of love!

* * * * *

"I must perish in my youth,
But, had I been better taught,
And did virtue as it ought.

* * * * *

I should not have fallen so low.

* * * * *

'Tis the wretch's dire mischance,
To be born in sin and woe.
Pity Thou my ignorance,
God of love!" ‡

In the sacristy of the cathedral of Cantania is a fresco, preserved with seruplous care, although by no means remakable for its merit as a work of Art: the interest attached to the picture consists principally in the startling fidelity with which the artist has rendered the awful event depieted; this is the eruption of Etna in the year 1669, and in the fresco that fearful catastrophe is set before the spectator with a vivid reality, truly surprising.

* Continued from page 133, vol. ix. No. v.

† Mary Howitt, "Lyrics of Life."
‡ Ibid, "The Heart of the Outcast."

A Sicilian artist, profoundly impressed by the terrors delineated in this work, assured the present writer that nothing short of the actual eruption could be more awfully true than the picture before us "so far as the eye alone is concerned," he added; "but there were sounds," continued the speaker with a deep shudder, there were sounds of which the pencil can of course tell you nothing, yet these gave an addition of horror such as never can be effaced from the memory of any who heard them. Nay, they are in my ears now!" exclaimed the excited Italian, and he lifted his hands to his head, as one who would shut out some fearful sound.

These words were uttered some few months after the last great eruption of Etna, to which our colloqnist had been witness; he was thus a competent judge, and, among other peculiarities of the dreadful scene, he described the effect on the trees, as the resistless flood of molten lava neared them. But this was not untill the frequent intercourse of a long journey, taken in his company, had produced a sort of intimacy, the subject being one that was evidently not to be lightly approached.

His home, to which he was then returning from the study of his Art in Rome, was at the distance of some twenty miles from Catania, and he had mounted his horse, as he subsequently related, at the first rumor of an eruption, but long before he reached the foot of the mountain, the terror of the animal compelled him to dismount, and the horse was left to the care of a vine-dresser. Proceeding on foot, our informant found his progress much impeded by smoke and sulphurous fumes; the sun glared fiercely through the lurid air; dark clouds, edged with glittering, hard, marble-like whiteness, such as he had never seen before, lent a further strangeness to the aspect of things, and the whole atmosphere was full of a sobbing, moaning sound, now rising into a sort of menace, and anon becoming little more than a fluttering sigh, as it were the last breath of a creature expiring in the agonies of torture.

Nor did this wailing seem to proceed from the mountain alone, all things appeared to sympathise with the Titan sufferer; earth, air, and sea alike sent forth the expression of grief and pain; all space was pervaded by that vast anguish, and the peasantry, familiar as they are with these phenomena, wore looks of anxiety and fear that became ever deeper as our informant drew nearer to the mountain. He had ultimately approached the rivers of lava so closely as to have his eyebrows singed off and his whole face much scorched; on our expressing surprise that he should endure so needless an afliction, he replied—"Nay, rather ask me by what influence I was restrained from standing, fixed and rooted as I was, until devoured altogether by that sea of fire; for the sights and sounds of that horrible night had exercised so strange a facination over me that during the greater part of it I sometimes think I must have been mad."

Then it was that our Sicilian acquaintance described the effect of the eruption on the trees: he spoke "with bated breath," and declare that, as the lava approached them, they seemed to quiver, with the dread of creatures concicus to their fate. The groans of those inanimate objects, as the glowing destruction neared them, had made it impossible to him to remember that they were not sentient beings, and had caused him to suffer a sense of pain and grief, the effects of which he had been long in throwing off. At the last moment, and when he no louger dared to look at them but from a great distance, all their leaves turned to a livid white; they were *blanched* by the ferver of the heat, and this before the lava had touched them; nay while it was yet at considerable distance. Once *touched*, they burst into raging flame in every part; and before that fatal river of death could fully roll its annihilating waves around them, each hapless creature had fallen on the flood, a heap of ashes.

"Each hapless creature," the speaker's own words: the idea of concious suffering had manifestly not even yet departed from his mind; nor could he recall the scene he had witnessed without shuddering.

That there was no exaggeration in this description was obvious; and we were ourselves in a condition to vouch for a portion of its truth, from certain facts presented to our notice on Mount Vesuvius, some years earlier. By an act of culpable imprudence, partly our own, but chiefly attributable to our guide, who should have used his authority to prevent it, we were for some time in imminent danger—a circumstance that never need occur on Vesuvius, as many of our readers will know. Into the details of that day's history we do not propose to enter; but it was then that we did ourselves behold the *instant* destruction described by our Sicilian acquaintance. The effect, however, is so extraordinary, that one requires the testimony of one's eye to believe it possible: at one moment, the object is there, in its entirety; before the succeeding second has passed, it has become a heap of white ashes; and even these—disappearing beneath the next heavily rolling wave of that low hissing flood, which seems to mutter anathemas on its victims,—do not leave the faintest trace to show that they have been.

A Franciscan monk, pleasing in manner, and much more highly cultivated than is usual with men of that brotherhood,* was the companion of the artist, whom he called Don Ippolito, and the color of whose life had apparently been changed by the spectacle he had witnessed. Other circumstances of the eruption, in addition to those related above, were subsequently described by both; but for these we have not space: our business is henceforward with the portfolio of the artist, which was freely offered to our inspection during the sort of intimacy that occasionally results from the fortuitous meeting of travellers.

Legends of the saints and subjects of similar character, predominated, they may, at some future time, be revered as altar-pieces in many a village church, among the more remote districts of the island. Here are some few of those best remembered.

The first is a legend of San Giacomo, and the saint is represented in the act of guiding a plough, to which he has harnessed a bear: beside him lie the oxen, by whom the office of drawing the plough had previously been performed but they are dead—the bear has killed them; and it is in token of the exhortations of San Giacomo, that Bruin permits himself to be harnessed in their stead.

And very earnestly does he bend himself to the work: a bear can look ironically enough when he pleases, as we all know, and is at no loss to mark his sense of a joke: but no thought of jesting is in the head of this good fellow; he wears a face of the gravest, nay the most compunctious solemnity, and lifts no eye to that of the spectator, as who should say, "Is not this rare sport?,' The Saint is equally intent, and the state of the ground gives evidence that their husbandry is making good progress.

A second study gives the conversion of St, Cyprian† by Santa Justina. Still wearing the robes of the Pagan magician, he stands before the beautiful Christian with face from which the last shades of doubt have departed; his books of magic-art lie neglected at his feet—soon to be given to the flames; and behind the Saint, who has converted the magician, is seen the figure of a handsome youth, departing with the action and expression of one reduced to despair. In this picture the artist has fully related the legend, which is simply as follows.

A noble of Antioch, long the suitor of Justina, has recourse to the magic art of a renowned sorcerer; but the latter, having exhausted his powers in vain, is at length reduced to inquire of Santa Justina by what means she has foiled his efforts, and ultimately caused the most powerful of his demons—whom, in his rage, he had finally cast loose on her—to declare himself, worsted, and decline all further attack. The Saint informs him that she does all in the power of the Cross, and the conversion of the sorcerer is the result. Receiving the right of baptism, he is thenceforward called Cyprian, and subsequently became Bishop of Antioch: he suffered myrterdom, together with Santa Justina herself, under the Emperor Diocletian, in the year 304.

Full of movement and spirit is the sketch that next succeeds;

* Taking the four great divisions of the monastic orders, the Benedictines are still the most learned, as of old; but among the Dominicans, men of solid attainments are frequently met with, and the Augustinians are not without instances of learning; yet neither they nor the Franciscans are considered to maintain so much of the distinction of older times as do the sons of St. Benedict.

† Not to be confounded with Cyprian, Bishop of Carthage, whose martyrdom—also by decapitation, for which cause he has the sword as one of his attributes—took place half a century before that of Santa Justina's convert, the Bishop of Antioch.

the legend is that of St. Egidius, who is standing before the cave which forms his hermatage. Within its shadow is the hind, which he has rescued; an arrow from the hunters, who have driven her to that refuge, still quivers in her side, whence the Saint has not had time to exact it: for the hunt is all upon him; but the dogs are restrained from entering the cave by the power of his sanctity, and certain of the hunters are already kneeling, although others yet remain contending with the saint, whose hand is extended between them and the rescued animal. The scene of this prettily told story is eminently beautiful, and will be remembered with pleasure by more than one of our readers—being a faithful reproduction of one of the wildest and yet most lovely defiles to be found in that exquisite region, of which Vico is held to be the queen and capital.

The last of these subjects that we shall now mention, represents the preparation for one among the many torments suffered by Santa Christina, who is discovered in her dungeon filled with reptiles, which have, however, no power to harm her. The rays of light, falling into her prison from narrow clefts in the rock-like walls, serve to exhibit the flexible forms and brilliant colors of these reptiles, which do but awaken new feelings of devotion to their Creator in the heart of the saint. These it was her wont to pour forth in hymns that troubled the repose of her enemies, and to repress them, an executioner is now entering the partially opened door; he holds in his hand the instruments with which he is about to tear out her tongue, but the Saint regards him calmly, and without fear.

All these legends were evidently depicted in good faith, and as events that had veritably occurred: that men of education, one of them a person of some learning, could so accept them, is, without doubt, extraordinary: yet thus it was; the grave simplicity with which all the details of these incidents, sought by the writer, were afforded, whether by the monk or his young friend, spoke clearly of earnest conviction. The smile of incredulity would have been deep offence; and the writer enjoyed all the more content in the examination of these studies, from the fact that no one likely to inflict such pain on their author, or his clerical guide, was partaker of the pleasure.

Among the many fair shrines were Art is most fitly worshiped, and which still reserve their almost untouched wealth for him whose genius shall supply the divining rod to their gushing founts, is that wherein the character and habits of the "feræ naturæ," the masterless denizens of the wild, may be "taken in the manner," and are shown—not as man has fashioned them to artificial life, in the haunts of luxury, but as boon Nature has made them in her solitudes, and as they revel and riot amidst the joyous abodes appointed to them by that Supreme Beneficence which has created them for happiness no less than ourselves.

Not that we would seek to undervalue the home-bred favorite —by no means; he, too, is heartily welcome, whether dog or horse, and whatever his rank, so only that he be perfect in his kind: the "cleverest', of hunters and the shooting pony "worth his weight in gold;" the wolf-hound and "my lady's brach" ;— none shall come amiss; but let not any, or all of them, exclude the frank inhabitants of mount and forest: give us the pride of our fields, and the pet of our hearths, but let us also have the gladsome dwellers by moor and stream.

It is true that we possess those glorious annals of deer-stalking, to which the world of Art ows so many a bright inspiriting theme, but we want more, and in more varied sort. Not to every man is it given to range brown moor and heathery fell at will, nor can the haunt of the boar of buffalo—so well beloved of the vigorous Fleming, so devoutly worshipped by the zealous and rightworthy Roman follower of Snuyders in our own day—be as readily attained by their English brethren; but neither are the narrower limits of lone vale and shadowy woodland niggard of their inspiration for such as seek aright. Let the votary bring but a spirit attuned to the delicious harmonies ever breathing around those unsullied shrines of Nature, which are equally the true fanes of Art, and for him shall the Genius Loci, waiting to be propitious by every altar, pour forth his fairest gifts.

Nor does any need to make a long pilgrimage; he has but to lift his eyes, and—provided always he be not "pent" within the noisome limits of some great town—there shall ever be wealth of objects for his worship. Great beauty or striking peculiarities of character, however attractive, are not indispensable: the least promising of localities will scarcely fail to present some portion of that life and movement which are among the first demands of the painter: treasures are to be found in each devious path of nature's own free tracing, and blossoms of loveliness hang on the lowliest bramble for him who has power to perceive them.

But say that you have the privilege of selection, and, taking of the best, have plunged into the recesses of our Hampshire woods. Go but deep enough, and you will not complain of your studio; neither shall there be any lack of company to sit for portraits, supposing the delineation of character to be one of your objects. There are wilds, or there were such, in the happier ancient days of some ten years back, in certain parts of the New forest (misnamed assuredly, seeing how venerable is its age), where your highest aspirations after beauty in nature shall be satisfied, while the "feræ" of the place will approve themselves to be in all respects of the purest water.

To secure these, you must, however, not content yourself with hovering on the verge of things, you must plunge boldly into the depths; press through entangling underwood, and never trouble yourself to be seeking a path, for where you go there is none. Count rather on the long thorny bramble, the sarcastic point of the fretful gorse, the lucent arms of the glittering holly, and bold Sir Blackthorn aiding them with such might as he hath; for all these shall oppose your access to that region of delights. Yea, your sweet friend the woodbine, will do her utmost to bar you thence with her delicate toils, nor shall the grave and solemn ivy spare his potent frown, to say nothing of those tendrils wherewith he has tied together a matted barrier of impervious broom and tough, though pliant fern.

Yet keep on; hold stout heart, and when you have beaten all down knightly, you shall—

"We shall get through, ridiculous prate-apace, and have done with it!"

Not at all! You shall do nothing of the sort: these are the mere outlying works, the more potent defences have yet to be stormed; but all mention of their names shall be spared you. Do I not know your "genius iritabile?" There are only some few hundred of good stout furzebushes, fifteen to eighteen feet high, at *this* moment impeding our passage, but as these are wholly impenetrable, we must e'en turn fairly back, and make our way as best we can to the point whence we got into this *imbroglio.*

Take patience, nevertheless, and by no means be discouraged; at our next attempt we shall be more successful in hitting the weak point, and that accomplished, great is your reward! Keep good heart only, for at length we stand in face of the portals to be forced. Dark strong-armed bats are crossing on sullen wing, for just now we are in the region of perpetual twilight, and the horned owl is adding his harsh remonstrauce, as he sits, marveling at our intrusion, among the branches of that stunted oak.

A more open space succeeds, and sailing across it come the dusky raven, the kite, on his wide powerful wing, and the sharp-beaked hawk, with his pitiless cruelty of gaze.

Or, less imposing but more cheerful of aspect, there steals from the copsewood an elegant-looking congener of the weazel tribe. He darts, lightening-like, across the sweet sunny glade,—which has at last repaid our toil,—amazed to find his delicious home invaded, and in haste to make the unwonted advent known.

The burley grey badger may, perchance, succeed our last hurried visitant, but for *his* arrival you may have to wait patiently, seeing that he does not care to enlarge the circle ot his acquaintance. The Fox is more accessible, or rather, being a gentleman of rambling propensities, you shall stumble on him now and then when neither of you has expected the presence of the other; and should you chance to beat up his quarters while his children are sporting around him, or when his lady, the vixen, has gathered the youth of their family for educational duties,

you need scarcely ask a more animated group for your sketch-book than that household shall present.

And while now we seat us beside the deep dark water-course, adown whose precipitous, but happily not very high bank, we have just tumbled with so little ceremony, to scramble up on the opposite shore, and have gained this fair sweet oasis of sunbright green, you shall hear an extract from the foxite annals.

The event commemorated is of the strictest truth—when they write history they keep wholly apart from fable, those well-judging foxes—its consequences plunged two respectable families of the ancient tribe of fox, into much grief, but though trying to your sensibilities, the story must needs be related, because there is at least a little dozen of pictures therein.*

The facts are as follow, and the scene to be depicted is on this wise. A flock of wild-geese have alighted on a broad estuary, rapidly narrowing into a sedgy river; the banks on one side are high and more richly wooded than is usual within the near neighbourhood of the sea, but the opposite shore is lower, and in the distance are the grey rocks of a bold wave-beaten promontory. From the underwood steals forth a well-grown fox, and perceiving the rich argosy on the water he at once proceeds to secure what he considers in his conscience to be his own portion in its wealth. Having drawn together a sufficient mass of tangled grasses, he suffers himself to float gently down beneath the veil thus formed towards the new arrivals, and under cover of the mask he has provided, succeeds in securing a heedless bird, whom he brings to land in good sportsman-like fashion. But there are certain considerations which prevent his beginning instantly to feast on the booty obtained, and he buries it amidst the low hanging branches of an old twisted thorn: that done he departs; but soon returns with a second fox, whom he leads directly to the tree, manifestly "on hospitable cares intent."

But "What are the hopes of man?" sings the poet—"What those of foxes?" he might have asked; for during our poor friend's absence, a lurking, poacherly fellow—see that you give him no free-forester look, but a veritable hang-dog aspect, won from many a jail—has crept from his hiding-place, and, carrying off the deposit from its rightful owner, has caused the consternation you are here to depict.

For a moment, our first acquaintance stands bewildered and confounded; his gossip, who arrived with that modest and disclaiming, yet well-pleased and above all respectful expression, with which men and foxes alike follow "L'Amphitrion où l'on dine," has at length begun to suspect an intentional affront! He turns fiercely on his late revered inviter, whom he now confronts with reproachful eyes; but the honor of our despoiled Reinecke is not to be questioned with impunity, a mortal combat ensues—or rather not *mortal*, it would hardly have come to that—they were foxes, and without doubt the reasonable creatures on the four legs would have presently thrashed each other into a better comprehension of the matter, nor suffered any grevious injury on either side: but now—and I grieve to say it—must the two-legged brute come into the picture; he holds his deadly tube—a disguised and contraband thing, without name or decent kindred, we may be sure—in the villanous left hand, which hath so manifest a tendency to hide behind his back; this he brings to bear upon the champions who contend but for their honor, and shooting the intended host through his hospitable heart, he knocks over the wonder-struck guest before he has recovered from his amazement, when he too, poor disabled innocent, becomes that pestilent jail-bird's prey.

After that, I can do nothing for the rest of our halt but bewail the unmerited fate of my hapless chums. Had they perished in fair chase, and with the music of the pack as their appropriate dirge!—But it skills not talking, nor can weeping avail, and I dry my tears. Admirable society in the woods is your fox, and good merry companions were these two, but with them we shall hold parley no more. "Woe is me, Alhama!"

His Imperial Majesty of France does but confirm the verdict of the French critics, when expressing his admiration for the works of our countryman, M'Innes; and it is to be regretted that his majesty's wish to become the possessor of the "Love and Piety," exhibited in Paris by that artist could-not be gratified. There would have been a decided gratification to the English *amour propre* in meeting that pleasant acquaintance among the gems of Louis Napoleon's private collection in our subsequent visits to his capital; but "the present proprietor was not to be prevailed on to resign it," say the Parisian *Litterateurs* in Art, and there is nothing more to be done. The "Scene from the Life of Luther," an earlier work of the same artist, has been equally appreciated by the German critics, these last considering him to be one of those among our countrymen "who are most successfully working for the future." Very high praise this from our thoughtful cousins, by the way, since they do not always give us credit for that upward tendency, and even reproach us occsionally with loving the gold that glitters to-day better than the Fame that beams from the future; nay, better than Art itself, which, in the bosom of the true votary, should be placed above even Fame.

Few things gratify the national vanity,' of the present writer more than expressions of approval from the great German authorities; their knowledge of the subject is unquestionable; they are invariably just; thinking of the work only, never of the artist, with whom they have rarely personal acquaintance; and this is not without its value, when the productions of the day are in discussion, as many of our readers doubtless know.

We hear so much of the discouraging influences by which our artists are oppressed, that methinks it may not be amiss to record some few of the "per contra," to borrow a phrase from the "Ships, Colonies, and Commerce" school. The artist we have named above, for example, is well known to have been long estimated highly in the Roman world of art, wherein much expectation was some years since awakened by reports of a work perfectly new as to subject, and certain to arrest universal attention, once it should leave the studio of the master. It has not yet appeared, and having no authority for the allusion, we refrain from describing its theme, but having deeply shared the interest excited by the rumor, one of our first inquiries on returning home, some time after, was for the painting in question, nor have we abandoned all hope of its appearance. The subject, as before remarked, we do not feel authorized to describe; but there are certain designs made by a different hand at the same period, respecting which we are under no such restraint; the artist, a very useful student, but one of much promise, being no longer in existence, and the sketches, the subjects of which were in fact suggested by the writer, being entirely at our disposal.

The first presents a scene of out-door life in Italy: it is but too familiar to the quiet-loving traveller, for who is there so fortunate as never to have had his repose interrupted by the clamors of the *Morra*? This game, said to have been invented by Germanicus, to preserve his Legionaries from the perils of inaction, is still the delight of the populace; they have its implements ever at hand, since it is played with the fingers only.

The object to be obtained is an accurate guess at the number of fingers thrown out by your adversary from the closed hand. Thus, loud cries of "Uno! Quattro! Due! Tre! Quattro? Due! Quattro! Uno!" yelled forth at the topmost strength of their triple-brass lungs, resound from many an eager pair, wherever idlers "most do congregate;" and in Italy where are they not?

Look at this group—would not a stranger believe those two men, there standing in fierce opposition, were preparing to tear each other's eyes out? How menacing are their gestures! how eagerly do they stretch forth their discolored fingers, each thrusting his claw-like hand into most offensive proximity with the visage of his neighbor. But they are only playing the Morra, or Mora, as it is elsewhere called; and such are the fascinations of what we should call that wearisome exercise, that few of their own class, passing within the wide-spreading limits of the echoing sounds uttered by the players, can resist the temptation to pull up and watch the result.

* The relation that follows is true to the letter; the incident was described in its minutest details by a sportsman, who witnessed all that took place, and has distorted no feature of the occurrence.

Fair specimens of half the vagabondage of Rome have accordingly gathered around the group depicted by our artist; but the place of honor is accorded to one whom you all know well —"The Sturdy Beggar" of the Scalinata namely, no less a personage; he, who, without any legs at all, will prove himself more than a match for both yours, if at any time you seek to distance him across the broad platforms of that winding way, the uppermost of which has long been his disputed domain. Get ready your *bajoccho*,' tis a poor return for his joyous "Buon giorno Excellenza;" but as none resist that appeal, so the drowry, carried to their carefully-selected *Sposi* by the daughters of this well-known mendicant, are said to be of no contemtible quality. Here we have him, returning to his dinner as do other men of business, when the toils of the morning have ended: he is mounted on a good serviceable ass, and his attendants humbly wait his pleasure, which, at this moment, is to watch the Morra. The head of our crippled acquaintance is a good portrait—the features are not those most frequently found in Italy, though the man is a Roman—they are rude, irregular, and somewhat harsh, the hair is verging towards grey, the eyes also grey, shrewd and keen; the general expression is bold, yet scarcely frank, and the whole face, though clever, is something short of prepossessing; nether limbs, our friend has none, and to this fact does he owe the prosperity of his fortunes.

The scene of our picture is the northern bank of the Tiber, near which that distinguished *Habitue* of the Piazza di Spagna makes his abode; the Ponte Rotto is within view; the church appearing on the far left is that of Santa Maria Egiziaca, and the Temple of Vesta may be discerned in the distance. Two Jewish ancients are holding consultation before the squalid entrance of what was once a palace, and beneath that broad portal are beautiful children, shaking their rags in a sort of frenzy, as they imitate the game performed by their seniors.

We have other incidents of life in Italy, depicted by the same hand, but, for the present, we prefer to select from sketches of a different character: these we take from the early times of our own history. And first we have the "Battle of Scarston."

Edmund Ironside, a noble figure, whose fine features and candid expression instantly bespeak our sympathies, is fighting hand to hand with the less graceful and more crafty-looking Canute. Already is the Dane slightly wounded, Edmund presses him closely, and manifestly holds the victory within his grasp. This is your first picture.

But there is unhappily a second, the warrior has treason beside him—alas for that old, old story, doomed ever to be repeated and scarcely stranger even to our own *spotless* times. Exalted from a low station to be Duke of Murcia by the injudicious partiality of Ethelred, significantly named the Unready, the father and predecessor of Edmund Ironside, Edric Stræon had resolved to slay his sovereign in the confusion of the strife; but, failing in this, and now perceiving that the battle was about to be decided by the fall of Canute, the traitorous wretch struck the head from the body of Osmear, an attendant of Edmund, and bearing a strong resemblance to his master; then, holding the head aloft on his sword, he cried aloud, "Fly, ye men of Dorset and Devon! fly and save yourselves, for here is the head of your king!"

Compelled instantly to forego his advantage over Canute, Edmund eagerly bares his brow and exposes his heated features to the gaze of all around him, exhorting them to take courage, but the effort is vain, a panic has seized his warriors, they fall into disorder, and all their prince's bravery and skill can but avail to maintain the combat until night once more closes on this, the second day of the conflict.

For the artist whose "joy is in the battle," there is here motive for at least two pictures—perhaps for more. Let us now see what becomes of the traitor.

Many changes have taken place since the battle of Scarston: other combats have been sustained by Edmund Ironside, but the hireling of Canute has found means to render even victory fruitless: what, in fact, cannot treason in high places accomplish? More; he has contrived the murder of his sovereign, while that of Edwig, brother to Edmund, is also ultimately accomplished by his agency. But this last has not been done to the satisfaction of Canute, whose part in the crime is rendered too obvious by Stræon's mismanagment. The crafty usurper has secretly vowed revenge,and Edric of Murcia is doomed. Rapacious as he is faithless, the traitor has entered that rude building on the Thamés, which serves as the palace of Canute, whom you perceive to occupy the chair of state; with intent to complain of broken promises, and to seek rewards too long withheld. Around the king are fierce-looking chieftains of his own land, and beside his chair is Eric of Norway; before them stands the Duke of Murcia, dark passions deform his else handsome face, and he angrily bids Canute remember that for him he had imperilled the welfare of his soul.

"Not for me," retorts the offended monarch, interrupting the stream of revelations fast pouring from the lips of the excited Edric; "not for me, but for thine own ambitious ends, hast thou defiled thy hands with murder. How traitor! thou didst compass the death of thy sovereign? Thou!—Be thine own words thy condemnation."

Canute turned towards Eric of Norway, who struck the Duke to the floor with the battle-axe. Others then fall upon him, he was strangled by their fierce hands before the eyes of the man who had bought him for evil puposes; and the last sob had scarcely been gasped forth from his blackened corse, before the voice of Canute rose high above the tumult. "This traitor, self-convicted, came to seek the reward of his treason," he exclaimed, "and ye have bestowed it fully." "Throw the carrion to the river," added the scornful monarch, and a moment later the dark waves rolled over the betrayer of his master.

History does not give us warrant for the introduction of any other figure that might relieve the gloomy effect produced by those iron visaged warriors who alone took part in the well-authenticated event here proposed for your study: boy-attendants might nevertheless be permitted to give the relief of their grace and beauty to the darksome group; dogs of appropriate breed would not be out of place, and even female figures might be suffered to cross the entrance of the rude hall, or be seen in the ante-room beyond it; but the persons truly belonging to our picture, are those here mentioned only.

Talking of battles, might it not be supposed that Byron had the fearfully glorious day of Inkermann in prophetic vision before him when he wrote the lines that follow. Could any one, writing from the field, have depicted more faithfully the dark opening of that terrible drama? Its anniversary is closing as the stanza is here transcribed.* May the lives then so freely offered up, avail to save the world from the frequent recurrences of these terrible Holocausts! But does not many a name, whether of the survivors or the dead, appeal to the sympathies of the artist as he recals that day, demanding from him the wreath of immortality which his hand—no less than that of the poet—holds the proud privilege of twining for the brow of the victor? They do, and he will admit the claim: let us now turn to the words of the author we have cited:—

"Hark! through the silence of the dull cold night,
The hum of armies gathering rank on rank.
Lo! dusky masses steal in dubious sight
Along the leaguered wall and bristling bank.
* * * * * *
No star peers through the vapors dim and dank,
Which curl in curious wreath. How soon the smoke
Of hell shall pall them in a deeper cloak!"

"Listen to the story of the nightingale! that the vernal season has come; the Spring has formed a bower of joy in every grove, where the almond-tree sheds its silver blossoms. Be joyous therefore, be full of mirth, for the spring season passes away —it will not last.

"Again the dew glitters on the leaves of the lily, like the sparkling of a bright scimetar; the edge of the bower is filled

* The commemorative bonfires were blazing on the distant hills when these lines were written. Future anniversaries will happily bring us less vindictive memories than those still permitted to mingle with the proud thought of our glorious "battle for the right" at Inkermann: wherefore let us hope that the November last bygone will prove to be also the last of the "Guy Fawkes" exhibitions.

with the light of Ahmed among the plants, the fortunate tulips represent his companions. Come, oh people of Mahomet, this is the season of enjoyment! Listen to me—listen to me! Be joyful, be full of mirth; for the fair season passes away, it will not last.

"Roses, anemones are in the garden, the time is past when the plants were sick, and the rose-bud hung her thoughtful head. Be joyful, be full of mirth—the fair season passes away, it will not last.

"The groves and hills are again adorned with all their beauties, bright and beaming are the flowers, rich and pure is the breath of their lips. Be joyful therefore, be full of mirth; the fair season passes away, it will not last." *

In remarkable contrast to this gladsome exhortation of the Turkish poet, is the "lament" of Scotland's Mary, as she too beheld the dew "glittering on the leaf of the lily," but for her the appropriate resemblance would scarcely be that of the bright scimetar: the many who would gladly have bared their weapons in her cause she knew to be powerless, and "the fair season" was far from "joyous" to her.

The "Lament" is familliarly known, yet there are few, if any memorials on canvas of the moment, one that but too often recurred in her sad history, commemorated by the verses in question.

That the lines are from her own pen adds greatly to their interest, but this circumstance is not their sole recommendation; they have a pathos, a simple beauty, not derived from any extraneous consideration, and its expression only. They were written, as most of our readers will remember, when the return of Spring had caused the royal sufferer more than ever to deplore the misfortune of her captivity. The verses are as follow:—

"Now Nature hangs her mantle green
On every blooming tree,
And spreads her sheets o' dasies white,
Out o'er the grassy lea.
Now Phœbus cheers the crystal streams,
And glads the azure skies,
But naught can glad the weary wight
That fast in durance lies.

"Now laverocks wake the merry morn,
Aloft on dewy wing;
The merle in his noon-tide bower
Makes woodland echoes ring;
The mavis mild, wi' mony a note,
Sings drowsy day to rest,
In love and freedom they rejoice,
Wi' care nor thrall opprest.

"Now blooms the lily by the bank,
The primrose down the brae,
The hawthorn's budding in the glen,
And milk-white is the slae.
The meanest hind in fair Scotland
May rove their sweets amang,
But I, the Queen of a' Scotland,
Maun pine in prison strang."

Touching and beautiful, these lines bring us an exquisite picture of Spring, no less than a moving tale of sorrow. The young artist who shall make them his theme can scarcely fail to produce a valuable addition to our mementos of the much-wronged queen: he will give imposing dignity to the fine figure, the delicate face, whose beauty is so familiar to us, shall wear an expression of sadness, yet redeemed from any suspicion of weakness, by the brightly intellectual cast of the lovely countenance. The landscape Mary looks on from her deep oriel window, with such other accessories as he will admit to a place in his picture, will all serve, in their various degrees, to heighten the interest of the work, but this is, of course, chiefly centered on the person of the Queen, at whose feet there is a hound sleeping: otherwise she is alone.

* The joyous song of the spring-time, given above, will be found in the Turkish of Mesihi; the translation is by Sir William Jones, but the stanzas are taken by the present writer from "The Boatman of the Bosphorus," vol. i.. pp. 206 and 236.

In the fifth canto of the "Purgatorio," and while the Florentine poet, with his Mantuan guide has not yet proceeded beyond the approaches to that place of trial, the former describes the ascent of a mountain, on whose declivities Virgil and himself are surrounded by the souls of the departed; all are advancing, like themselves, towards the "girone" where their appointed probation is to begin.

At a fair height on the mountain are the shades of those who had lived to the end of their days in a state of sin, and were finally dismissed to their account by a violent death. But "having repented at the last moment, and then *forgiven their murderers*, they were reconciled to God in their death," says the poet.

Among these spirits is that of Buonconte of Montefeltro, of whom Dante inquires wherefore the place of his burial had never been discovered? In reply to his question, Buonconte bids him know that "having expired on the banks of the Archiano, his body was carried into the stream by a flood, on whose waters it was born to the Arno," where the corpse was lost amidst the depths of that river.

In the course of this relation occur some fine lines, presenting a fair study for the painter. Of the peril that may be mingled with the hope conveyed in the passage, we are not now to speak. The lines are these:—

"Arrivo io forato nella gola,
Fuggendo a piede, e sanguinando 'l piano
Quivi perdè la vista e la parola:
Nel nome di Maria fini, e quivi
Caddi e rimase la mia carne sola—
Io dirò 'l vero, e tu 'l ridi' tra i vivi:
L'Angel di Dio mi prese, e quel d'Inferno
Gridava: 'O tu dal ciel, perchè mi privi
Tu te ne porti di costui l'eterno
Per una lagrimetta, che 'l mi toglie." *

The lone wild bank of the rushing and foaming river, with the fallen yet still darkly beautiful Spirit of Evil, vainly demanding his hoped for prey from the radiant "Son of Heaven," within the shadow of whose glittering pinions may be dimly discerned the vaporous presentment of what once was Buanconte. All these may serve to awaken the imagination of the painter, to whom we leave them. A passage from the nineteenth canto has also very tempting elements, and I defer the transcription of the stanzas with regret, but they must, for this time, be resisted, as must likewise an eloquent description—but of sowewhat different character—inviting us by the voice of Ariosto. "Not all that is deferred, proves to be lost," however, says the French proverb, and these, that we now relunctly postpone, may find place some other day.

* The writer would have been glad to give the translation of this passage by Cary, holding it better to take the maturely-considered work of an approved author than his own crude and hasty rendering, *pro re nata*; but failing Cary—not to be obtained at the moment—the following may suffice to give the mere sense to such of our readers as shall prefer to see it in English:—

"Flying on foot, with pain I reached the shore
Of Archiano. In my throat I bore
The deadly gash, pouring a crimson rain,
That, where my faint foot passed, bedewed the plain.
Here speech and sight forsook me, but I cried,
Hopeful, to Mary mother ere I died.
Then lay my corse, all prone and lonely there.
True are my words, do thou their truth declare
To all of mortal race—God's Angel took
My soul, but o'er me hell's dark spirit shook
His dusky pinions. 'Wherefore, Son of Heaven,
Hast thou,' he cried, 'from me my conquest riven?
That soul was mine; yet to the brighter sphere
Now shall he rise, *and all for one poor tear*.'"

Purgatorio, Canto Sesto.

(To be Continued.)

To Remedy Yellow Albumen Proofs.—Wash the proof well after removal from the toning bath and place it in, say a quart of water, in which drop 20 drops of a saturated solution of bichloride of mercury in muriatic acid. Remove the proof when it has attained the tone of purple desired, and carefully wash it. In this way even green proofs can be restored in a few minutes to a beautiful purple.—C. R. Edwards.

PRACTICAL TREATISE

On the Employment of Commercial Papers in Photography.*

BY STEPHEN GEOFFRAY.

Translated from the French for the Photographic and Fine Art Journal.

APPENDIX.

§91. Our task would be unfinished, and our object would not be attained, if we should not add to the preceeding chapters the necessary directions to enable the photographer to execute alone the formulas we have just given; and to prepare by himself, at the least expense, with certainty and intelligence, the materials we have advised him to use.

§92. Citric Acid.

The juice of a great number of acid fruits contain citric acid already formed. The juice of our green gooseberry can furnish 1 per cent. of this crystallized substance. But we generally derive it from juice of citrons.

The juice of citrons must be left to itself for some days in order that the mucilagious matter may be precipitated. It must then be poured off, and the liquor saturated with carbonate of lime, well pulverized, stirring it in little by little. The combination is facilitated by heating to the boiling point; citrate of lime is formed which, being insoluble, is precipitated. We wash the precipitate in boiling water until it becomes perfectly colorless; then while hot it is decomposed by sulphuric acid. The proportions are 1 part of citrate of lime, dry, and 3 parts of sulphuric acid to 1·15 specific gravity. The citrate and acid should be mingled in a little cup and agitated during the reaction. Sulphate of lime is formed, which we separate by filtration from the citric acid, which becomes free in the liquor. We evaporate the latter carefully till there is a formation upon the surface of a crystallized skin; it is afterwards left to itself. The crystals formed are yellow, but the citric acid of commerce is white.

To obtain white crystals these must be dissolved anew in water; then boil the solution over some animal charcoal that is deprived of its carbonate and protosulphate of lime. We filter the liquor and evaporate it with the same precautions as at first.

In order that the crystals of citric acid may be of the largest size, such as those are which we buy, there should be a small excess of sulphuric acid during the crystallization. But sulphuric acid, in the preparations of which we have treated, is nothing less than fatal for subsequent results; it is therefore necessary to entirely purify the citric acid from it, when we use the latter for photographic purposes. To do this, you must dissolve this substance, and mingle with it when cold a small proportion of carbonate of lime, or better, oxide of zinc well pulverized; agitate these a few moments, afterwards let it settle and strain it, then crystallize carefully. Crystals of great whiteness, but smaller, will then be very pure and excellent to use.

The citric acid of commerce is also very frequently adulterated with tartaric acid, the price of which is much less, and its photographic properties are also much inferior. We can easily detect this fraud by the appearance of the crystals, which are not so white and are more lengthened; we can burn some crystals upon incandescent carbon, and they will diffuse the strongly characterized odor of burnt tartar; or we can add to the aqueous solution of the acid a solution of carbonate of potassium, and there will be formed a precipitate of tartar in fine powder, if the citric acid has been adulterated. Lastly, if we pour some citric acid, saturated with ammonia, into a solution of nitrate of lead, and a precipitate is formed, we can conclude that the substance has been adulterated.

The crystals of citric acid are not deteriorated by the air, and consequently are easily preserved. Their strong acid taste becomes agreeable when they are dissolved in a certain quantity of water. Their solubility in water is very great; 3 parts of this liquid at the temperature of 18° will dissolve 4 parts of the crystals. Boiling water dissolves more than double its own weight. It is to be noted, that the aqueous solution of citric acid, however slight it may be concentrated, ends by being decomposed even in closed vessels. Citric acid reddens turnsol paper. It is combined with a great number of bases to form salts, some of which are soluble and some insoluble. Water dissolves citrates of potassium, of soda, of ammonia, of maguesia and of iron. But citrates of lime, of barytes, of strontia, of zinc, of cerium, of lead, of mercury, of copper and of silver, are insoluble. Nevertheless, these last salts become soluble in an excess of acid, or in every other acid capable of forming soluble salts with their bases. Citric acid does not thicken azotates of silver. It reduces the chloride of gold; it modifies sugar of milk, after a prolonged boiling to the point of rendering it is soluble in alcohol, and augments considerably its solubility in water.

Pure citric acid among other advantages it has over the crystallizable acetic acid, is of cheaper price, and great fixity; it is not consumed by simple volatillization, and consequently does not leave a continual uncertainty respecting the doses to be employed, and finally its use is not so fatiguing and unhealthy to the operator; if the paper used contains lime, the citrate which will be formed in it will not have the inconveniences of the acetate of lime (see §8). As to the salts of silver that it forms, they have all the properties of acetates of silver.

Finally, numerous experiments often repeated, have determined me to use in my photographic manipulations, nothing but citric acid in the same doses, and for the same processes.

§93 Ammonia.

This substance is gaseous under ordinary temperature and pressure; but it can be preserved in water which absorbs it very easily. It is colorless; its taste is acrid; its odor that of urine and very penetrating. It is the most common combination of azote; it is formed whenever the two elements of azote and hydrogen meet in a nascent state.

The ammonia of commerce is prepared by mixing in a retort some sulphate or carbonate of ammonia with lime; it is formed from the sulphate or carbonate of lime; and the ammonia disengaging itself in a gaseous state follows the tubes disposed for this purpose, which conduct it into vessels filled with water where it is absorbed.

The ammonia becomes pure only in the last vessel; but, in all cases, the water which absorbs it there, has not this quality to a sufficient degree for photogenic purposes. It is therefore always prudent to subject the ammonia of commerce to the following preparation:

In a flask containing distilled water, we plunge to the bottom a tube conveniently bent which proceeds from a bulb into which has been introduced some of the ammonia water of commerce. Then heat the bulb, but stop the operation when the *tube* conducting the gas commences to be heated, for then the water is passing into vapor.

Thus purified, the ammonia burns over a sheet of glass without leaving any residue. It is not colored in presence of acids, and does not precipitate the acid azotates of silver and barytes.

Ammonia is a very powerful alkali, easily dissolving fatty substances. This property fits it for the washing of papers. It is a base which neutralizes the most energetic acids. It is employed therefore to neutralize citric acid in paper, when that oxide has been employed to dissolve metallic impurities.

There are also no inconveniences, even if it remains in the paste of the paper; its existence in presence of the salts of silver, is rarely of a bad effect; in this relation it is that the presence of this alkali, in excess is the least vexations, especially if citric acid is used instead of acetic acid. Ammonia also, by its slow decomposition, assists insensitive preparations.

Photographers know that ammonia easily dissolves chlorides of silver, it can therefore fix ordinary positives; it is at the same time a means of very agreeable tones. It gives to proofs all the tones of red sepia.

§94. Soluble Amidons.

The soluble amidons of commerce, must not be confounded either with dextrine or with *truly* soluble amidons of the labo-

ratories, although these three substauces may be modifications of amidon by the same acid. The amidon *called* soluble, although it seems to be truly dissolved in cold water, soon becomes thick when the latter is evaporated and forms a starch.

Dextrine, if it is well prepared, gives, when the water cools, a gum which always preserves its transparency after evaporation, but it is granulated. The amidon, which I apply to the amelioration of papers, must have been sufficiently modified not to become thick sooner than good dextrine, after the evaporation of its solvent; but preserve the most beautifully limpid transpareucy; the eye should not be able to detect the least granulation any more than in the gum of dextrine. The employment of an amidon so modified, must be of an excellent result. The sizing that it forms has no more inconvenience than the sizings of ordinary amidon, or of dextrine, hitherto advised; these last, in effect, if they strengthen the paper,* yet granulate it besides, and consequently bring iu one element more of irregularity in its tissue.

The soluble amidon with which we have occupied ourselves, is nothing more than *glucose* ; it differs from it by many properties.† We do not describe this substance here; the subject is sufficiently important to merit a large place in a treatise upon "Chemistry applied to Photography;" we only speak here of the means of preparing it for the applications that we have counselled.

§95. We shall give several processes for modifying amidons to the point necessary for our applications, each one can choose the means most agreeable to his own resources and skill.

§96. To obtain soluble amidon; 1st. take 500 gram. white amidon, 100 gram. chlorhidic acid, 1000 gram. distilled water. Leave the three substances in contact, *cold*, for a longer or shorter time, then boil them for some hours, when you perceive the mixture to be perfectly limpid, strain it through linen, evaporate it, in order to have a precipitate of amidon more promptly with less of alcohol. Collect the precipitate formed by the addition of alcohol; place it upon a linen strainer, wash it with a little alcohol diluted with water, and dry it, in order to be able to keep it for future use. You can at any time dissolve this powder, either alone or in mixture, with 2·10 of sugar. (The same result could be obtained by employing, instead of chlorhidic acid, either sulphuric, or azotic, or phosphoric acid. *I* prefer chlorhidric acid to every other, because the least washing with alcohol disembarrasses the amidon of it sufficiently).

2ndly. Take 1 pound (454 grammes) of the best white amidon; add 1 piut (5 decilitres) of distilled water, cold, so as to form a slight paste and heat it. Then boil in a little cup of porcelain a mixture of two quarts (2 litres of distilled water) and 2 ounces 60 grammes of sulphuric acid; add little by little, continually stirring it, the paste of amidon; keep it boiling 15 minutes, and pour it into a large bottle so as to fill it; put the bottle in a large vessel filled with a strong solution of salt in water, boil it anew 12 hours, the bottle being carefully corked. Put the liquid thus obtained into a basin, add chalk or spanish white in powder, as long as the effervescence continues; then strain it through linen, filtrate it over animal carbon, and evaporate it so as to reduce the volume to a little less than a litre.‡ Lastly, precipitate the amidon by alcohol, if you wish to keep it in a state of solution. Observe that this solution be completely neutral.

3dly. Take 500 gr. white amidon, 100 gr. of the concentrated solution of chloride of zinc melted, consequently entirely exempt from free acid. You then have a thick starch; subject it for many hours to a high temperature, 150° at least, by means of an acid water bath, or a bath of oil. When you think the reaction sufficiently prolonged, let it cool.§ Precipitate the amidon by alcohol, wash, dry and preserve it. I should premise that soluble amidon so prepared, if it preserve some traces of zinc, even iu a combined state, may precipitate the albumen with what it was mixed; it would therefore be well to substitute gelatine for the latter.

§97. Those who do not wish to take the trouble of preparing for themselves their soluble amidon, or who are not so situated as to do so,—those who are on a journey for instance—I advise to employ the iodized amidons of Dr. Quesneville, either in the state of *soluble* powder, or the syrup of amidon; these things are found in all pharmacies. Those who have recognized in these substances some very advantageous photogenic properties, and would prepare these amidons or such as are equivalent at least, can follow some processes which have been published for many years, and have succeeded perfectly: as

1st. Take 9 parts of powder of amidon sifted, and 1 part of iodine; mix them well, moisten slightly the iodized powder with a little distilled water. Introduce the mixture into a retort slightly corked,|| plunge the latter into a water bath that you keep boiling from 20 to 24 hours. Let it cool, then wash the powder with alcohol; filtrate and dry the powder remaining upon the filter and preserve it in a flask well corked with emery. (The above is Dr. Bodart's process, 1851).

2d. Take 9 parts of amidon that you have broiled with care (over metallic plates of sheet iron, or copper, or yet better of plated metal), add one part of iodine reduced to powder, mingle it all gradually by pounding it vigorously. The mixture being well made, introduce it into a little mattrass which is corked, aud put it into a water bath of boiling water; at the end of an hour or two, sometimes much sooner, the mixture which was grey becomes dark blue, agitate it to facilitate the general reaction. The product cooled is afterwards washed with alcohol, which takes away the traces of iodine uncombined with amidon.

Note.—After having broiled the amidon,¶ it is necessary to expose it sometimes to the air, to make it retain its hygrometric state. (Process of M. Maques Labens, of Toulouse, 1851).

§98. These different powders of iodized amidon become of an excellent solubility, in all proportions when they are boiled sometimes in mixture with one-fourth of sugar. The syrup which results from this preparation is a very good photogenic coating.

§99. I have observed that the presence of iodine in the soluble amidon, with which we now occupy ourselves, can impede the mixture of this composition with albumen, because the solution of the latter would be coagulated; I have added that it would be well here to use some gelatine, therefore as a connector. I ought to say here, that the addition of some grammes of caustic soda in the mixture where albumen had been introduced, would re-establish the solution of the latter, if the coagulation should take place, and would prevent it, where it has not yet been produced.**

§100. Serum and Sugar of Milk Modified.

Sugar of milk is an extract by evaporation from serum of milk.

Serum itself can be obtained in the following manner: some grammes of citric acid dissolved in water are poured into heated milk. The *caseum* and *butter* precipitate themselves in the form

* We have already pointed out the advantages of the employment of amidons for ameliorating papers ; these advantages result especially, as we have said, from the identity of composition observed between cellulose and the amidons.

† Among others, it combines with iodines, and in this combination it is colored blue as strongly as all other amidons.

‡ Process of M. Lyte (extracted from Kosmos.)

§ Communication of M. Regneault upon the labors of M. Be'champ (Academy of Sciences).

|| A glass matrass is more convenient; the mixture is more easily introduced and extracted. An ordinary bottle will give the same result or any vessel with narrow neck, if it be made of what will not combine with iodine.

¶ The broiling has the effect of disaggregating the amylaceous substance, of dividing it, so that the subsequent reactions are made much more rapidly and effectively. The boiling is not therefore necessary, it is only a means of avoiding afterwards a too long exposure over the fire.

** I prefer the employment of soda to that of potassium to aid the solution of the albumen, because to simplify the composition of mixtures and to avoid the complication of re-actions appeared to me the wisest method in photography. But the soda is already one of the essential elements of albumen. In adding this alkali to albumen, we augment the proportion of its elements, but we do not complicate it with a new substance.

of lumps; it is then decanted, strained and boiled, the dissolved citric acid being again added until it precipitates nothing; then it is clarified with two or three whites of eggs to the *litre* (a french measure of 1·760 pint).

The serum or milk owes its precious quality of keeping the lights of the proofs, and of preserving the salts of silver from the reducing action of the fibres of the paper, to the presence of sugar which it has in solution.

Besides sugar of milk, serum contains soda and several salts, among others some phosphates.

Sugar of milk or lactic acid is in little colorless crystals, hard, inodorous, of a taste slightly sugarish. It is unalterable in air, little soluble in cold water, insoluble in alcohol. It is not precipitated from its aqueous solution by any salt, nor by alkalies, nor by acids; it does not ferment like other sugars, it absorbs ammonia and chlorine gas with avidity.

§101. M. Vogel has found a modification for it of which I have profited. It consists of rendering it soluble in alcohol, and in all cases very soluble in water, *in all proportions.* The process is this: in a porcelain kettle I mingle 50 parts of sugar of milk, 200 parts of water, and 5 parts of citric acid; I boil it many hours, taking care to replace the evaporated water; then when I see the mixture pretty limpid I let it waste; and lastly I strain it into a plate as *caramel.* I keep this new sugar from dampness for it discolors under that influence. If I wish to dissolve it in alcohol, I leave it to dissolve for many days.

If there is a doubt of the effect of citric acid on albumen in any case in which we would employ sugar of milk, modified in a mixture with this substance, it would be well before letting it waste, as we said just now, to saturate this excess by carbonate of lime in powder; we should strain the liquor, and put it again, very neutral, over the fire in order to obtain the caramel.

Turnsol paper is the easiest means of testing whether the solution is acid or neutral, according as it is colored red or blue, on being immersed in it.

§102. Albumen.

Albumen exists in great quantity in chyle, in the serum of blood, in milk, and also in a great number of plants.

For the purposes of photography, we extract it generally from hen's eggs, of which it constitutes a part of the white.

It is colorless, transparent, inodorous, slightly alkaline; it makes the syrup of violets green (which property it owes to the carbonate of soda that it contains). There is 23 per cent. of sulphur in most eggs. In the eggs of fishes this proportion is replaced by phosphates. The fading of proofs on albumen is to be attributed to the influence of sulphur.

§103. Liquid albumen becomes solid at the temperature of 75° Cent. It coagulates under the action of acids, cyanurets, perchlorides, alcohol, ether, essences, and certain metallic oxides. In the latter circumstance it forms salts.

§104. Alkalies augment its solubility, and often re-establish it.

§105. In the white of the egg it is imperfectly liquid; it contains some fatty matter and is found mingled with fibres of which it is necessary to deprive it with care. For this we whip it in a vessel till it is reduced to a froth, then let it settle and decant it.

§106. So treated, albumen is disembarrassed of its fibrous matters, but it is not pure although it suffices in this state for photographic preparations. To have albumen chemically pure, we operate in the following manner: The liquid obtained, as it has been described above, is evaporated at a temperature which ought not to exceed 50°. The albumen is soon dried into a transparent cake, resembling the beautiful *Colle de Flandre;* we reduce this into fine powder, then wash it carefully first in ether then in alcohol. Albumen is thus purified of all fatty substances with which it was charged; and nothing remains but the salts of which it cannot be purified without completely depriving it of solubility.

After the washing in alcohol, the powder of albumen should be well dried, without which the alcohol would produce upon the powder its coagulating effect, when it should afterwards be dissolved in water.

It should be well understood that I do not indicate this means of purification in order to *prescribe* the trouble of it; Natural albumen has given hitherto sufficiently beautiful results. I profit by the circumstance merely to counsel the use of dried albumen. On a journey, it is a great resource; we know also that the albumens of all countries are not equally photogenic; lastly, eggs do not give, in all seasons, an albumen sufficiently good. I have remarked also that the powder of dried albumen afterwards dissolved, either with the aid of a twentieth part of caustic soda,* or simply in pure distilled water, gives me some films upon glass always free of those spots that we attribute too exclusively, to the dust perpetually suspended in the open air.

§107. Collodion.

This substance is so important in photography, that it merits a special study: the use of it that we indicate in this treatise, having only a relative interest and not requiring any particular preparations. We shall leave its history to another occasion, and its most precious applications; only now telling the easy means of producing it sufficiently good for the end to which we destine it.

We steep some carded cotton in one part of saltpetre (nitrate of potassium), powdered, and three parts of concentrated sulphuric acid. The cotton is kept in this mixture during two or three hours; then washed in a great deal of water until the washing water will not redden at all the turnsol paper put into it; then it is completely dried; then it is dissolved in etherized alcohol in the proportions indicated.

§108. Oil of Coal.

The oil of coal which I advise,† is produced by the distillation of the tar of coal; it is the well rectified *heavy oil* of the makers of asphaltum.‡ This oil must not make any modification of color upon the turnsol paper; it must be perfectly neutral. I obtain it, excellent for the use I indicate it, by the simple manipulation which follows.

I pour into a litre (which is a little more than a pint and a half), of heavy oil; thirty grammes of sulphuric acid, I agitate the mixture, and I introduce it into a glass retort, to the tube of which I adapt a bulb with a long neck, which serves to receive it. I advise, in order to avoid every accident during the distillation, that the retort be heated in a sand-bath. A refrigerating bath for the recipient bulb is useless, the oil resulting from the distillation is condensed with the greatest care. If the product is not yet neutral, it must be neutralized by the addition of some drops of sulphuric acid; a reddish composition being formed at the bottom of the vessel, we decant and try the liquor again.

§109. This oil contains in solution paraffine,§ and it is doubtless to this body that it owes especially the advantages that I have pointed out. The oil changes color quickly when exposed

* In the sensitizing of paper, it should be remembered that its preliminary preparation should be strongly alkaline.

† I ought to forwarn operators that the use of this substance is very disagreeable; the odor of oil of coal (that of tar), is of painful persistance; it impregnates every thing with great rapidity, which is vexatious; but at the same time that this product is advantageous in result, it is also of very low price. I ought to confess that notwithstanding its ascertained good effect, and my well controlled experiments I have not returned to this substance, for during its manipulation I was not only disagreeable to all into whose presence I came, but also to myself. If I have made particular mention of oil of coal, it is to the end especially of calling attention to this substance, in which I foresee some precious applications even for photography.

‡ This oil obtained with care, is the substance from which benzoin is extracted; it goes from the first alembic charged with ammonia; it often contains sulphuric acid; it is composed of different light oils, and of fat iodides like paraffine, etc.

§ Paraffine is a true mineral wax; it is called fossil wax in the north of Europe; it is a very stable substance and resists very well the most energetic reactives, pure acids, &c. In studying waxes, I have been struck with this advantage; but the difficulty I experience in procuring them in the country, the slowness of the papers which were prepared from it have made me think it was better to keep up the use of bees-wax. To those,

to air and light; it grows brown and even thickens; I believe that it is possible apart from this inconvenience, which we can avoid by a special rectification, to derive advantage for the heliographic reproduction upon stone and metal of photographic images. I have made some attempts in this path which make me hope soon for satisfactory results.

Concluding Observations.

As my intention, in commencing this little treatise, was not to study papers in all points of view, but merely to indicate practical means of ameliorating the papers of commerce, that we have at present, I have abstained from all consideration of the changes that may be made in the composition and fabrication of papers, to render them at once proper for heliographic applications; a thing which should be done only by learned men who can furnish the necessary information: but I will, in all humility, call the attention of competent persons to this subject.

1st. Is it not better to employ in photography, paper made entirely of cotton? I know the difficulties of fabricating such a paper: but would not the advantages that we should find in this product, balance a little this inconvenience?

2nd. Would not the application of gluten, which is found always mingled with the cellulose of the materials employed, to a direct sizing of the papers be possible, and very advantageous?*

3rd. Would not this simple sizing suffice: that is to say, might not the care of sizing papers at need, in order that they might be of a more easy working, be left to each operator? Would it not also avoid a thousand complications, a thousand uncertainties?

4th. Would it not be very easy to render the effect of the metallic sheets and tissues upon which the size of paper is formed and conducted between the cylinders and rolling mills, as it goes out of the vat completely insensible?†

5th. Lastly, is not the study of the papers destined for photography, sufficiently serious and interesting to merit the attention of special men, and the official care of the learned?‡

however, who wish to have an excellent dry paper, however slow it may be, I advise the use of paraffine dissolved in benzoin according to the following formula:—Benzoin 500 gr., paraffine purified 10 gr. This bath should be iodized directly, and according to the object.

M. Tiboullet has also advised the use of paraffine; but this photographer employs this substance according to the method of M. Legray, impregnating his papers with the aid of iron, lime, and iodizing by a subsequent manipulation.

* We know that the rotting by the sun is a method happily abandoned almost everywhere: this rotting was especially favored by the decomposition of a certain quantity of gluten.

Gluten in actual papers, in France especially, is very rare; the papers of Saxony on the contrary, contain it in sufficiently large proportion mixed with cellulose.

† Papers whose web is too strong, have two immediate inconveniences which render the use of them impossible. In the first place there is no efficacious method of hiding this web; the images by transparency have traces of it and give positives *quadrille;* besides the web being formed by very strong inequalities in the composition of the texture, the image produced in the paste is found falsified in its lines, and is a failure.

‡ Would such a subject be unworthy of the cares of a special committee of some of our learned societies.

ON THE EXPOSURE
Of Positive Prints to a Sulphuretting Atmosphere.

BY MR. F. HARDWICH.

In testing the action of a solution of sulphuretted hydrogen upon paper positives, it did not appear to me that the conditions under which the prints were placed bore a sufficiently close resemblance to the case of positives exposed to an atmosphere contaminated with *minute traces* of the gas; and this more particularly because we know that *dry* sulphuretted hydrogen has comparatively little effect upon photographic prints.

The experiments were therefore repeated in a somewhat different form. A number of positives (about three dozen) printed in various ways, were suspended in a glass case, measuring $2\frac{1}{2}$ feet by 21 inches, and containing $7\frac{1}{2}$ cubic feet of air; into which was introduced, occasionally, a few bubbles of sulphuretted hydrogen, just sufficient to keep the air of the chamber smelling perceptibly of the gas. A polished daguerreotype plate was hung up in the centre to serve as a guide to the progress of the sulphuretting action.

By the second day the metal plate had acquired a faint yellow hue, not easily seen except in certain position; but the positives were unaffected. At the expiration of three days the majority of the pictures exhibited no signs of change, but a few untoned prints of a pale red color, some of which had been printed by development and others by direct exposure to light, had perceptibly darkened.

After the eighth day the action appearing to progress more slowly than at first, was stopped, and the prints were removed. The general results obtained were as follows:—

The daguerreotype plate had become *strongly* tarnished with a film of sulphuret of silver, which appeared yellowish brown in some parts and steel-blue in others* The positives were, as a rule, toned to a slightly colder shade, but many of them had scarcely changed. *One* only had turned yellow in the half shadows, viz. a plain paper positive which had been previously toned to full blackness in old hyposulphite.

No obvious difference was observed between prints developed on paper prepared with serum of milk or with citrate, and others printed by direct exposure to light; but positives on ammonio-nitrate paper highly salted were somewhat less affected than albumenized positives, or positives on English papers simply salted, or on foreign papers prepared with citrate or tartrate. In others words, the prints obtained by those methods which gave a very red image after fixing were first to show the change of color due to sulphuration, the proofs submitted to the test having all been previously toned with gold.

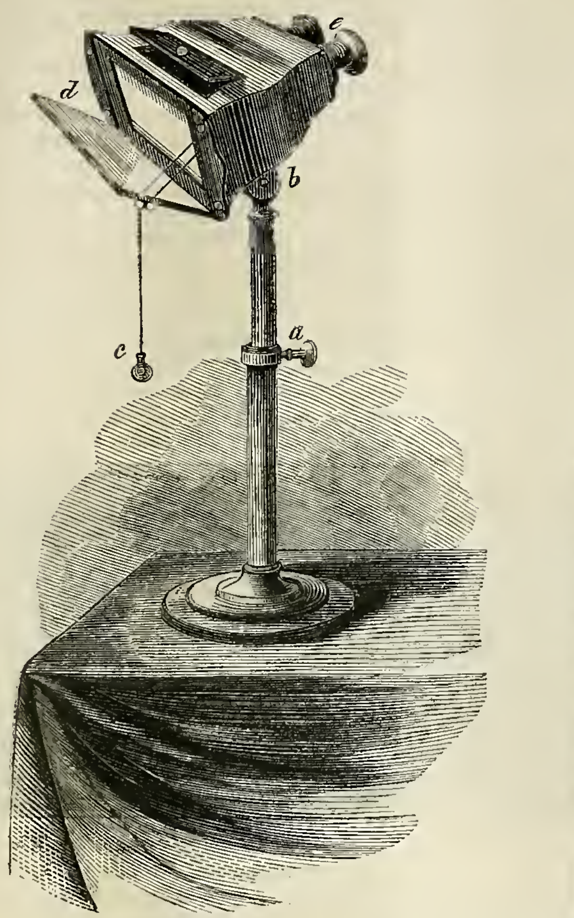
On a careful review of the results of these experiments, I cannot but think that if photographic prints are kept in a dry place we shall have no occasion to fear injury from the sulphuretted hydrogen of the atmosphere. The state to which the daguerreotype plate employed in these experiments was reduced by the action of the sulphur indicates as much; for it cannot be conceived that the same plate would have become so thoroughly tarnished in any reasonable number of years if it had been preserved in a portfolio, or placed beneath glass. And yet even under these disadvantageous conditions *one* print only out of the total number was rendered useless, and that one had been prepared by a previous process of sulphuration which is now exploded. The others, although slightly toned by the sulphur, were far from being ruinously injured. This was proved by washing them for twenty-four hours in running water, to encourage *oxidation* and consequent yellowness; but none occured, the half tones remaining intact. If we consider therefore how many years would elapse, with proper care, before an amount of sulphuration would occur equivalent to that resulting from an exposure of *eight days to air smelling of sulphuretted hydrogen,* and if to this we add the time required for the subsequent oxidizing process required to complete the destruction of the print, I think it will be allowed that we must look for other causes than the presence of traces of sulphuretted hydrogen in the atmosphere to account for the occasional fading of carefully washed prints.

Hydrofluoric Acid.—An Acid compound of hydrogen and fluorine. To prepare it, pour concentrated sulphuric acid on half its weight of fluor spar, carefully separated from silicious earth, and reduced to fine powder. The mixture must be made in a capacious *leaden* retort, and a gentle heat applied. Collect in a leaden receiver surrounded with ice. This acid acts as an accelerator when mixed in small proportions with bromine or bromide of lime. It, however, cauterizes glass and is extremely detrimental to the lenses of the camera, and as it is no improvement to the daguerreotype should not be used.

* This plate will be exhibited at the next meeting of the Society for the inspection of the members.

THE STEREOSCOPE.

The Sterescope is now seen in every street, it is found in almost every drawing-room; philosophers talk learnedly upon it,



ladies are delighted with its magic representations, and children play with it. Notwithstanding this, we find a very general ignorance prevailing of the principals upon which this instrument is constructed, and still greater want of knowledge of the philosophy which it involves.

We are so little in the habit of asking ourselves questions about *common things*—to employ a very hacknied phrase—that there are not many men or women who have paused a moment to consider—Why, having two eyes, they do not always see all things double? The stereoscope, to a certain extent, answers the question; it is, therefore important—and it cannot be without interest—that we should endeavor to explain, as popularly as possible, this instrument, which enables us to see things as they are in nature.

We derive the term sterescope from two Greek words— στερεος *solid*, which we commonly employ in *stereotype* signifying *solid type*; and σκοπεω, to *see*, used also in *telescope* and *microscope*. The word therefore means *solid to see*, the instrument converting images drawn upon a plane surface into apparent solids, or images possessing three dimensions—*length breadth* and *thickness*. If we first describe the construction of the stereoscope, the subsequent explanation of its principles and its phenomena will be rendered more intelligible. The accompaning figure represents one of these instruments, mounted in the manner now adopted by the *London Stereoscopic Company*.

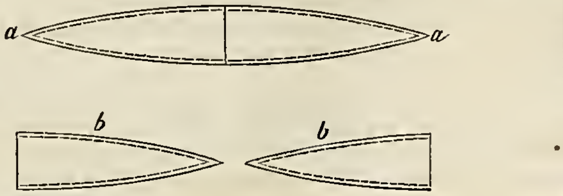
The refracting or lenticular stereoscope—as this form of the instrument is called, to distinguish it from the reflecting stereoscope, which we have already described (*P. & F. A. J.* vol. ix. p. 9) consists of two eye-pieces at *e*, adjusted as in an opera-glass; an oblong box, with a door on one side, to allow the light to fall in upon the pictures on opaque tablets; and a flap, *d*, which can be adjusted at any angle by the adjusting pully, *c*, the object of this opening being to render visible pictures upon transparent surfaces. This stereoscope is mounted upon brass pillars, which can be fixed to any height convenient to the observer by the screw, *a*, while the instrument can be placed at any angle by means of the joint at *b*. By these simple methods the stereoscope is rendered perfectly convenient for all kinds of pictures, and under all circumstances for observation. The brass eyepeices, *e*, in which the optical arrangements are placed, are capable of adjustment to meet the differences in the width between the two eyes which are found occasionally, and the variations in focal distance to meet the conditions of sight.

Such is the external structure of the instrument. The pictures which we place in it for observation may be geometric drawings

THE GLEN OF MEIRINGEN, SWITZERLAND

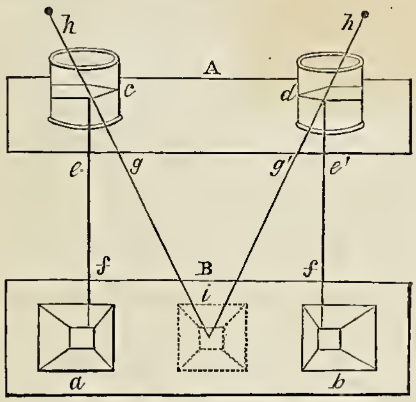
made according to a fixed rule, photographic pictures upon daguerreotype plates, or positive copies on paper or glass from collodion negatives or collodion positives. Two pictures of the same object, or set of objects, are mounted side by side on the

slide, as in the accompanying landscape, "The glen of Meiringen, Switzerland," and this being placed at the base of the stereos-



cope, and looked at through the eye-pieces, resolves itself into one image of perfect solidity—a miniature realisation of the picturesque scene itself.

The lenses of this instrument are but parts of lenses; this we must explain. The above figure, *a*, is a secture of a double convex lens, the inner lines being intended to indicate the fact that such a lens is virtually two prisms together at their bases. Such a lens is cut into halves or quarters, and these are placed in the instrument with their edges opposite each other, as *b b*.



The rays of light passing through the air and then traversing a denser medium are bent from their straight path, or refracted, and the degree of refraction depends upon the density and thicknes of the medium traversed. The rays of light radiated from any illuminated object falling upon a triangular piece of glass—a prism—suffer considerable refraction; and if, looking through the edges of two prisms, we observe two images, properly constructed, and continue onward the lines of sight, we shall find the two pictures will resolve themselves into one image.

To explain this, let us suppose a skeleton stereoscope—engraved on the former column. Two geometrical figures. *a*, *b*, the lines forming a square pyramid, are on the tablet, and these are viewed through the prismatic lenses, *c*, *d*, the rays proceed from the objects along the straight lines *e f* and *e' f'*, but those rays entering the lenses are bent, and enter the eye along the lines *g h* and *g' h'*. Now, if those lines are continued to *i*, it will be seen that the two images will be superposed, and form one; so that, under those circumstances, one image only would be visible, namely, the image at *i*, and by throwing the pictures in the stereoscope slightly out of adjustment, this may be rendered very evident by the appearance in the instrument of parts of three pictures.

The reader will necessarily now inquire how it is that a solid image ,a figure having three dimensions, results from combining two dissimilar pictures. We must endeavor to explain this.

Draw a circle upon paper, and a line as its diameter; place a thin straight object upright exactly in the centre, and so that the line and the rod are both in a verticle plane passing between the two eyes. Bring the eyes near this arrangement, close the right eye; you will see the line to the left hand of the upright; open the right and close the left eye, the line will now appear on the right hand of the rod. The image seen by each eye is proceeding in an opposite direction, as the arrow in the woodcut on the present page. With a very little practice these two images may be *squinted* into one. The result will then be the same as that produced in the stereoscope, a solid arrow proceeding directly towards the eye.

Again, place a cube upon some books arranged as a flight of steps. Place the hand as a screen a short distance in front of the nose, and shutting first one and then the other eye, make a drawing of the arrangement under each condition. The result will be what we have represented, but these will resolve themselves into a system of solids when observed in the stereoscope.

Stereoscopic pictures are indeed, the pictures of objects as viewed with the right and the left eye respectively. We are not—until reminded of the fact—aware that we must (seeing that the pupils of our eyes are about three inches apart) view every object under a slightly different angle. Without going into the question of vision, or examining with minute accuracy the structure of the eye, it will be sufficient for our present purpose to mention the main facts.* We see, because the rays of light which fall upon any body with different degrees of intensity, these varying with the color, condition, and contour of the surface. These surface radiations passing through the pupil of the eye, suffer refraction by the crystaline lens, and a picture is formed on the retina of each eye. By taking the eye of a recently killed animal, and cutting an opening in the upper part,

through which we may look in upon the reticulated membrane, we can see the picture as in a camera-obscura. The *retina* is an extension of the optic nerve, consisting of an infinite number of the most delicate fibres, piercing through a peculiar dark-colored pigment at the bottom of the eye. The arm and its great nerves, divide in the hand into the fingers and smaller and more delicate nerves, and with these we feel objects. Now the optic nerve, when it reaches the eye, is divided into a thousand optical fingers, which *feel* the slightest variation in the quantities or the intensities of the light-rays falling upon their extremities, and the *sensation felt* by the delicate members of the eye is communicated to the brain, and this constitutes vision, the sense, of sight, the effect of a luminous cause. The pictures drawn upon the eye vary as much as in the difference of the angle due to the two passages through which the rays pass—the pupil of each eye—to the optical arrangement within, which is so exquisitly delicate and refined. Each two corresponding points of the two pictures are *seen* at the converging of the optic axes, the eyes uniting each pair of points in succession, and conveying to the mind the impression of a solid.

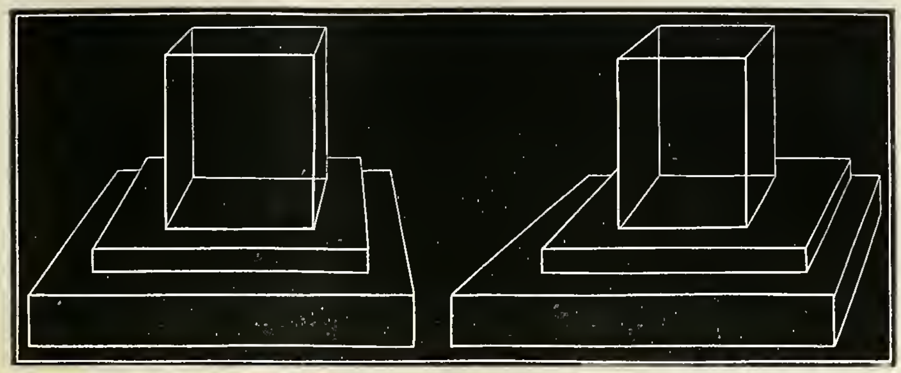
It is difficult, if not impossible, with the knowledge which we have of solid bodies, to ascertain the effect upon a single eye, without the mind. We immediately adjust according to our preconceived knowledge; and hence, even with one eye, men see, under nearly all circumstances, objects of three dimensions. Yet we may prove some of the advantages of two eyes, in giving us a correct notion of solidity.

* Those who are desirous of examining the best authorities on the phenomena of vision, may consult the following authors:—Young's "Lectures on the Mechanism of the Eye," *Philosophical Transactions* vol. xci.; Brewster, *Edinburgh Philosophical Journal*, vol. i; Wollaston, "On the Semi-Decussation of the Optic Nerve," *Philosophical Transactions*, 1824; Wardrop, "On blindness," *Philosophical Transactions*, 1826; Dr. George Wilson, "On the Extent to which the received Theory of Vision requires us to regard the Eye as a Camera Obscura," *Transactions of the Royal Society of Edinburgh*, vol. xxi.; Ditto, "Researches on Color Blindness," *Sutherland and Knox, Edinburgh*, 1855.

My moderator lamp is burning on the table before me. I rest my head on my right hand, and closing my right eye, mark carefully how much of the circular form I can make ont, and the arrangement of light and shadow on its ornaments; without moving my head, I open the right eye and close the left. When the left eye is open I see further round on the left hand of the lamp than when it is closed; and so of the right hand side when the right eye is opened. Now ,if I open both eyes, I see round on either side better than I did with one eye; I have a more distinct perception that the cistern of the lamp is round.

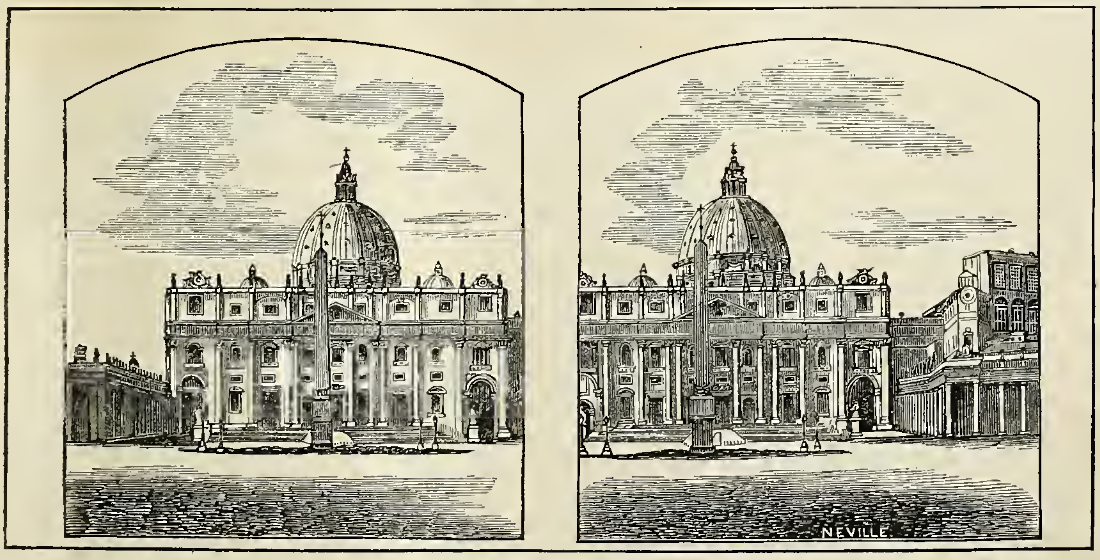
Now the stereoscopic pictures are the pictnres of the same bnilding, statue, landscape, or of any other group of objects, as seen respectively with the right and the left eye. We have these pictures on a plane surface—mere lines and shadow, as we see in the woodcut, representing the Chnrch of St. Peter's, Rome, as seen below.

These pictures, as previously described, are by the prismatic lenses resolved into one. Our space forbids us from entering more into detail than we have done; we feel that our descriptions are necessarily imperfect from the conciseness to which we



have been compelled; we would refer those who desire to know more of the stereoscope to the prize essay on this instrument recently published by the London Stereoscopic Company,* and we would recommend the student or the amateur to visit their establishments, and to examine their collection of stereoscopic views from almost every quarter of the globe.† It would be almost impossible for the most accomplished artist to draw two such pictures with sufficient correctness to produce the solid image in the stereoscope. The photographic camera, and the sensitive photographic processes which we now employ comes to our aid. A single camera obscura may be employed to take the pictures from slightly different points of view; or two cameras with lenses of the same facal length may be adjustified at the required angle.

If the object is 100 feet from the cameras, their lenses should be placed 4 feeet apart; if 150 feet distant, 6 feet apart; and so



SAINT PETER'S, ROME.

on, varying the distance of the cameras, or of the points at which we place our single camera, with the nearness or remoteness of the object, By carefully examining the views of Meireugen, in Switzerland, and of St. Peter's, at Rome, which have bee engraved with much precision from the immense stock of the London Stereoscopic Campany, it will be seen that as we have stated, the pictures are not identical in either case. They are, in fact, in this, as in all other examples, a pair of pictures of the same scene, and the same temple, as seen with either eye. There are various modications of Sir David Brewster's instrument, one of which, that by Mr. Knight, we desire specially to notice; we shall do so probably in our next.

By the extreme sensibility of the photographic processes, we are now enabled to obtain pictures of objects in remarkably-short spaces of time. The moving clouds and the restless sea can equally be fixed upon our sensitive tablets, and these, viewed in the stereoscope, become so real as to cheat the senses. Under every aspect of light and shadow we can copy nature in

* The prize offered by the London Stereoscopic Company for the best essay on the stereoscope was awarded, by Sir David Brewster (to whom the duty was confided by the Company), to W. O. Lonie, Esq. Professor of Mathematics at Madras College, St. Andrew's—one of the candidates for the chair of Natural Philosophy at Mareschal College, Aberdeen. This essay we shall bring under review in our next.

† The views, of all classes and orders, are many thousand in number; they comprise several hundred views of the Crystal Palace at Sydenham, and of the late French Exhibition; scenery in great abundance, English and foreign; historic buildings, &c. &c.; passages of great interest taken at Herculaneum and Pompeil; and views in Africa, Portugal, France. Rome, the Rhine, Venice, Florence, Padua, Pisa, Milan, Verona, Genoa, Nice, Heidelberg, Como, &c., consisting of cathedrals, statues, monuments, &c., collected with taste and care. In these are comprised the ruins of the great buildings of Rome, its forum, temples, triumphal arches, castles, &c. &c.

her wildest as in tranquilest moods. The humid vally, with the sinuous river, reflecting back the sun's rays more lovely than he sent them; the forest with its mazy windings, and the fitful strugglings of light to pierce its leafy recesses, are brought out in the stereoscope with a magical reality. The gigantic vegetation of tropical climes, the stunted growth of artic regions, are realised here in a way which defies the most skilful painter, and thus the stereoscope may be made the medium of conveying the best possible lessons in natural history, and by calling into play the powers of observation, greatly advance the education of the people.

By means of the stereoscope and photography, the Bible student may examine the rocks of Ararat and the plains of Mamre; the desolation which marks the submerged Cities of the Plain, and the endurance of man's work in the pyramids of the desert; the homes of the idolatrous Assyrian, and the temples of Darius the Persian. The student of profane history may wander over Marathon, and grow patriotic at the view of Themopylæ. The works of the intellectual Grecian, who breathed the breath of poetry into marble, and the efforts of the sterner Romans, who had more of the genius of war than of love in all their efforts after the beautiful, may be studied in a modern drawing-room in the laborer's cottage.

We have heard the stereoscope called a toy; to some it may appear to be so: but, even if its charming productions are viewed in sport, there must still be drawn from it an earnest philosophy, for it must teach men to love the beautiful in nature, and to appreciate the efforts of mind in the productions of Art.

ROBERT HUNT.

From Notes & Queries.

MR. LYTE ON A NEW PROCESS FOR PRINTING POSITIVES.

In the course of some experiments on photographic printing, I have hit on a process which is very remarkable as threatening completely to abolish hypo from the photographic laboratory. It depends on the fact that the phosphate of silver darkens under the influence of light (a property first noticed by Dr. Fyfe), and its complete solubility in an acid liquid. I have already produced very fine results by its means, and see a fair promise of a subsequent improvement. The method, as I employ it at present, is as follows:—The paper is salted on a solution of phosphate of soda *i. e.* the common or trisbasic phosphate, containing 1 part of phosphate to 25 of water. When dry it is to be sensitised with a solution of nitrate of silver containing 1 of nitrate to 5 of water, and after drying is to be exposed as usual. When printed it is to be placed in a solution of nitric acid, composed of 1 of acid to from 30 to 35 of water. Here the sensitive phosphate instantly dissolves, and in five minutes the process of fixation is complete. It is now to be washed in one or two waters, and then to be placed in the coloring bath, which may be either *sel d'or*, as described by Mr. Sutton, or the acid of chloride of gold, described by Legray. *Sel d'or*, however, gives the finest tones. If the proof be thought too dark when finished, it may, after being passed through a bath of water, in which has been dissolved a bit of carbonate of soda, be placed in a bath of very weak cyanide of potassium, not more than 2 or 3 to 1000 of water. Great care is, however, requisite in this treatment, as the action of the cyanide is most energetic even when thus diluted. Otherwise, after a short washing with one or two changes of water, it may be deemed fixed and ready to be dried and finished. It should be rubbed when mounted with the encaustic of wax and turpentine. This process is doubtless capable of much improvement. Thus I have not the least doubt that if the proof were first washed, phosphoric acid might be advantageously substituted for the nitric fixing-bath; and it yet remains to be found out how to produce the requisite tone in the proof without the intervention of a seperate coloring bath of gold. Fine proofs may be obtained by sensitizing as above, and then, after an exposure of only a few second, developing in a solution of gallic acid.

When the requisite strength is arrived at, it is to be fixed in the acid bath to fix it, and then toned, washed, &c. as before.

The proof I enclose is a sample of this mode of printing, and it is not waxed, in order to show you the nature of the process more perfectly, and to offer facility to the testing of the picture as to fixity, if you may desire.

I wish to add a few words to what I have already addressed to you on the subject of printing by phosphate of silver, and thereby avoiding the use of hyposulphite for fixing. The process is very successfully applicable to the albumen. To make the albumenizing liquid take—

Albumen	500 parts.
Water	500 "
Phosphate of soda	65 "
Acetate of soda	32 "
Sugar of milk	50 "

All these by weight: perhaps 35 grammes of borax might be advantageously substituted for the acetate of soda, but of this I am not quite sure. The last three substances to be reduced to fine powder. Mix them all together, and whip them up into a fine froth as for the ordinary process. When settled, take the clear liquid, strain it and pour it into a dish. Prepare the paper on this liquid just as usual. Sensitize with a bath of nitrate of twenty per cent. Print as usual,—only remember that in this process the picture loses nothing in the fixing, so do not print too dark. To fix the proof, I make roughly a solution of phosphoric acid by adding nitric acid to phosphate of soda. Take—

Phosphate of soda	450 parts.
Water	2000 "
Nitric acid, sp. gr. 1·35,	250 "

All by weight.

Pound the phosphate of soda, and mix them all together; when dissolved, they are fit for use. Nothing is requisite but to place the proof for a short time in a little clean water, to take out the principal excess of the nitrate and then to plunge it into the fixing bath above mentioned. After being in this bath for five or six minutes, it is completely fixed, which may be known by the disappearance of all the yellow color of the phosphate in the light parts of the proof. It is then to be washed in clean water, and is fit for the coloring bath. The best color is produced, as far as I have yet seen, by the use of Mr. Sutton's bath of *sel'dor*, an excellent method of making which has been given by Mr. Hardwich in the *Photographic Journal*, No. 35. This salt, however, contains hypo in a small proportion; and it may be deemed an advantage to fix without hypo at all. A good bath, giving very fine tones, is composed as follows:

Chloride of gold	1 part.
Common salt	1 fifth of a part.
Hydrochloric acid	2 drops.
Water	500 parts.

In this liquid the proof colors nearly, if not quite as well, as in the *sel d'or*.

All that is requisite after the coloring bath is that the proof be washed and mounted. I must also add one or two words of caution. The reason of adding the acetate of soda is for the double purpose of neutralizing the nitric acid set free by the decomposition of the nitrate of silver and phosphate of soda and water, and also to give an increase of sensibility, which it appears to do. The nitric acid, phosphate of soda, is intended to produce an extempore solution of phosphoric acid, but a solution of that acid in the pure state may be, perhaps, substituted with advantage. When the liquid ceases to act it is because it is saturated with silver. All that is then required is to add most cautiously some hydrochloric acid, which will precipitate all the silver as pure chloride, and leave all the phosphoric free and ready to act over again. Great care must be taken that no excess of hydrochloric acid be added; but if by mistake this should be the case, a cautious addition of some nitrate of silver solution will extract it all again. Nitric acid should be tried to see if it precipitates with dilute nitrate of silver solution. The phosphate of soda and the acetate must also be tried to see if the precipitates

they form are completely soluble in nitric acid; if they leave any insoluble residue they are unfit for use. Phosphate and acetate of soda being efflorescent salts, should be kept in a corked bottle, otherwise they are liable to vary in composition. If the albumen is to be kept, a drop or so of oil of cloves, or camphoretted spirit, added to the water before mixing will be found advantageous. Take care also that the water used, whether for fixing or for mixing the solutions, contains not the least trace of any substance which precipitates with nitrate of silver. This process gives pictures quite equal to any known process, and bids fair to produce prints of complete permanence.

F. Maxwell Lyte.

APPLICATION OF GUTTA PERCHA TO PAPER FOR COLLODION.

STEPHANE GEOFFRAY'S PROCESS.

[From *La Lumiere* of April 5th.]

After observing that all the present methods of transferring the collodion film are full of difficulty, and that negatives obtained directly by collodion upon paper are not equal to those on glass, M. Geoffray suggests the use of gutta percha on paper for collodion. He expresses himself quite satisfied with the results of his experiments. The sensitizing salts, he says, do not penetrate the coating of gutta percha, and the pictures come out of a transparency and quite equal to the best specimens on glass.

He then describes his manner of operating as follows:—I choose papers highly glazed; their quality and texture are of no cosequence, provided that their surface be sufficiently smooth. I fill a vessel, as deep as the sheets of paper are long, with a solution of gutta percha in benzine. I roll the sheets one by one broadwise, and plunge them successively in the dish. When it is full, and the bubbles of air which show themselves have all come up to the surface, I take out the sheets and hang them up by one corner to dry. A flat dish should not be used for the bath of gutta percha, as the surface would give off to much evaporation, and the bath would quickly lose the excess of benzine, which is necessary.

To prepare the solution of gutta percha, I put into an ordinary bottle about 50 grammes of the gutta percha of commerce cut up into small pieces; I add benzine up to three-fourths of the bottle, and I stop with a cork, but not too tightly, because I place the bottle in hot water, and wait until the gutta percha is dissolved; and if the bottle is heremetically closed, it may burst. When the gutta percha is melted, the liquid assumes a reddish color I let it staud in a cool place five days or more, until it is perfectly clear, I then pour off the solution, which is nearly colorless, and which is used for filling up the deep vessel.

When I wish to sensitize the paper I take a plate of glass; I pass over it with a brush a coat of glycerine, and make the sheet of paper adhere to it, avoiding every bubble of air; I then spread in the usual way a film of collodion; I lift up the paper and plunge it in a bath of silver of 6 per cent. I take care to leave the collodionized side upwards, to avoid all contact with the bottom of the dish. When the iodide of silver is formed, I again lift the paper, let it drain a minute, and wash it in two waters, to rid it of all the nitrate of silver. I then replace it on the glass, which retains some of the glycerine; or if not, some may be added. The paper is now ready for use.

If the required exposure to light be long, it will be as well to pour over the collodionized surface a mixture of glycerine and nitrate of silver in the following proportions:—

Distilled water	100	grammes.
Nitrate of silver	1	"
Glycerine	15	"

We know that glycerine is equally soluble in water and alcohol, nay, even to a certain degree in ether; and it is this which may make its application to collodion very valuable. I develope the image as on glass.

The fixing being ended, I lift the paper from the glass which supports it. I wash it with care, so as to remove all the glycerine which it may retain. I dry it, and wax if necessary.

I may add, that the paper coated with gutta percha is also well adapted for use with albumen. Albumenized papers, after this preliminary preparation, are in all respects equal in delicacy to pictures on glass, and they are much more easily prepared.

NOTES OF A TRIP TO EUROPE.—No. 5.

Friend Snelling:—After spending a day in Marseilles, I took passage for Leghorn upon one of the steamers that run down the Mediterranean as far as Naples. It was noon when we steamed out of the harbor. We had a full quantity of passengers, a mixture of all nations—Hatiens, Turks, Greeks, and a goodly number of French officers en route for the Crimea; a few English, and last, but not least, a couple of Americans, for we had hardly got under way ere my quick vision discovered amongst the crowd a fellow-countryman; and I can assure you I was not long in making his acquaintance; and what made it more gratifying was, that he hailed from near the same place as myself. We were soon upon terms of intimacy which made it pleasant. We had a pleasant sail all that afternoon, as the steamer shaped her course through the many islands that stretch along the coast. Now and then we had a beautiful view of the shore as we neared some projecting promitory, and it was late when we retired for the night, so delightful and pleasant was the evening. The following morning it was stormy, and in entering the harbor of Genoa, we lost all its boasted beauty owing to the unfavorable state of the weather, and we were close into the city of palaces before we had a view of it.

As the steamer was to remain here some 36 hours, most of the passengers landed—my new-found friend and myself amongst the rest. It was Sunday, and we had a chance to see the city in its holiday attire; but few of the streets can be called beautiful, with the exception of one or two of the principal ones, which were one continuation of palaces; many of which we entered to examine their superb galleries of paintings and statuary, and we beheld many marks of wealth that told of the days when Genoa sent forth her commercial fleets to every clime, and her merchants boasted of more than regal wealth, and the city was hailed as *la supurba*. Very few of the public buildings are of great beauty, though many of the churches are rich and magnificent. The following day we made an excursion some distance from the city along the shore of the Mediterranean to the Villa Pallavicini, which is a most lovely spot. It is laid out in winding paths, beautified with arches, statues and fountains, while here and there may be seen a miniature cataract, and caverns with subterranean lakes; while from a projecting point the visitor looks forth from some mimic ruin and castle upon the bright blue sea beyond. It is more like a scene of enchantment than one of stern reality. After wandering about for hours, we turned our steps towards the city, before entering which, we refreshed ourselves by a delightful bath in the deep blue waves. The balance of the time allowed us on shore was passed in wandering through the town, amused by the many strange sights that came to our notice. I was much struck with the beauty of the Genoese ladies of the upper class, and their long, flowing head-dresses were so much more graceful than the insignificant little French bonnets perched upon the back of the head. In passing along the streets, I looked for some signs of photography, but I was only able to discover a few dark, dingy specimens. I think if one or two good American operators would visit Genoa and start business, they would soon make a fortune. There is one thing certain, there are few places to which they could go where they would find handsomer subjects to operate upon. I give this as a hint to some enterprizing Yankee. You may rely upon it, it is a grand opening. I was on board the boat before the time stated, as I preferred to be early in preference to being too late, particularly as my passage was paid. It was sundown as we steamed out of the harbor, and as the weather was clear, we had a delightful view of the city as it circled around the bay, raising step above step as it receded from the shore, until it reached the summit of the hills, which were in many instances crowned by citadels. The city certainly

presents a most lovely sight from the sea, with its projecting moles, upon which is placed the light houses, whose flickering luminaries were seen long after the city was lost from view. The next morning we were aroused early with the information that we were at Leghorn. I hastened and dressed, and went upon deck, and sure enough, there we were. There were about one hundred vessels in port, and from the peak of several I saw floating the stars and stripes of my own native land. We were detained for over an honr before we were allowed to land. I parted with my friend, as he went on to Rome. Though only the acquaintance of a day, I felt a ray of sadness in parting. I promised to meet him in a few days in Rome. We were taken from the steamer in small boats, as they are obliged to lay out from the quay to prevent any connection with the shore without the knowledge of the custom-house officers. After landing, our passports were examined; we then were allowed to enter the city, where I only remained for a few hours, as there is but little to interest a stranger. The town is clean, and the streets wide and well paved. There are some few public buildings that have some pretention to architectural design. Upon the quay, I noticed a fine statue of Ferdinand I., by Giovanni dell' Opera—the four Turkish slaves in bronze at the corners of the base are powerfully modled; they are said to have been copied from a father and three sons taken at the battle of Lepanto. I noticed in the shops most beautiful work in pearl and coral, a branch of trade largely carried on. After getting my passports signed, I left Leghorn for Florence. There is a railroad connecting the two places. Soon after leaving Leghorn, we arrived at Pisa, where I remained a short time to examine the famous leaning tower. It is a most singular structure, the perpendicular reaching 13 feet beyond the base. There has been many conjectures as to the cause; but I think there is not the least doubt it is owing to the uneven settling of the foundation, for we find that some distance from the top the proportions are altered, the columns being higher upon the leaning side. The heavy bells are also placed so as to counteract in some measnre the deviation. The ascent is by 330 steps, and the view from the top is very fine. Close by the Campanila is the Battisterio with its massive dome; and near to it the Dnmo, which owes its foundation to the success of the Pisans in their wars agaiust the Saracens in the year 1663. The merchadize taken in their exploits was devoted to the building of this edifice, which has been added to from time to time. It is stupendous in its proportions, and is rich in works of art. Many of the first masters of Italy have been called upon from time to time to contribute to its splendor. After leaving Pisa, the road passes through a productive valley where the vine is largely cultivated. Before reaching Florence, you pass along the valley of the Arno: it is one of the most productive and beautiful in Italy, and presents many a picturesque scene; but all this was soon forgotten as I entered the gates of this delightful city.

F. D. B. Richards.

For the Photographic and Fine Art Journal.

TO TRANSFER COLLODION PICTURES TO WAXED CLOTH.

Six honrs after the picture has been taken, pour *strong* alcohol over it; let it drain a moment, but before it has dried or been absorbed by the film, lay on it a piece of of *toile ciree*, or black waxed cloth, sometimes called enamelled cloth. Previous to applying, rnb it briskly with a piece of dry cotton, breathing on it at the same time. This is done to smooth the surface and to render it slightly adhesive. Cut the cloth a little smaller than the glass, the border left to be wiped off with the finger slightly moistened, or cut by the finger-nail. It must not be rnbbed or pressed down, bnt by simply placing on it a piece of glass, and leaving it undisturbed two or three hours, it will be found to have adhered to the cloth. Remove the cloth carefully, by commencing at one of the corners.

As the waxed cloth is not mnch in use here, I wonld mention for the benefit of those of your readers who desire to try it, that I purchased some at the northwest corner of Canal street and Broadway.

This is not a discovery of mine, I fonnd it in the "*Comptes rendus*" of the French Academy. C. A.

From La Lumiere.

THE SOLUBILITY OF GLUTEN.

M. Victor Serre, of Santadar, (Spain) in a letter published in the last number of the Journal *La Lumiere*, asks for information in regard to gluten and its solution. He states his inability to dissolve gluten either in alcohol or acetic acid. Why he should not in alcohol it is easy to understand; but this substance is nothing less than a dissolvent of gluten, and we know that to analyze this latter snbstance, we make use of precisely the property which alcohol professes to cause by cooling a deposit of a substance analogous to caseine, and preserving in solution the glutin of which we have already had occasion to speak.

As to the solution of gluten in acetic acid, it is a fact known by chemists, and it as probable that the gluten which our correspondent employed was a damaged or impure gluten. M. V. Serre tried particnlarly to dissolve the granular gluten of M. M. Veron fierès, which for the last several years has been used largely for soups. It will be sufficient to explain the mannfacture of granulated gluten to show that M. Serre could not in fact succeed in attaining a perfect solution of this gluten in acetic acid. Gluten is extracted according to the process of M. E. Mortin—it is extended, in its fresh state, in an eqnal weight of farina, its ductile property being made use of for its conversion into strips, separated from each other by an interposed layer of farina. Having reached this point, it is carried to a trough where it is cut up mechanically between two concentric cylinders turning in the same direction, but at different speeds, the smallest, which works rapidly, being armed with a number of jutting pegs. This trituration produces oblong grains of gluten contaiuing interposed farina. These grains are dried in a stove by a current of heated air, of the temperature of from 40 to 50 degrees. This stove is furnished with moveable drawers which facilitate the exposure of the moist grains, and their withdrawal when dry.

M. Payen, who has given some attention to the granulated glnten, gives the following statement of its composition:—Take 100 kilogrammes of fresh gluten, containing 38 parts of dry gluten, mix these 100 kilogrammes of gluten with 200 kilogrammes of farina, containing 24 parts of dry gluten. From these 300 kilogrammes a mixture results which on drying is reduced to 228 kilogrammes of granulated gluten, containing 27·2 of dry gluten, more than double the quantity of this principal contained in the farina employed.

As may be seen from the preceding description, it is not astonishing that M. Victor Serre found himself unable to completely dissolve Veron brothers' granulated gluten, which contains more farina and starch than farina itself. Had he employed freshly prepared gluten and acetic acid, he would have met with a different result.

By employing alcohol, the skilful photographer of Santrader may make use of the solution of *gluten*, which it is possible to concentrate sufficiently for sizing or otherwise improving photographic papers. We have ourselves had occasion to experiment on this class of substances; but from our results we perceive no great advantage in them over the substances generally employed. The solutions of gelatine, albumen, &c., may moreover be made anywhere, while it is very difficult to obtain pure fresh gluten, although its preparation is wholly elementary; and as our attention in photography, must be directed to economy, we must say that the solution of gluten is in no wise economical.

There is a subject we should like to see the friends of paper photography engaged in—we mean the utilization of certain vegetable products, such as pectine, pectase, pectic acid, the pectates and their derivations. We have had occasion to revert to the subject ourselves.

* Kilogramme—1000 Kilogrammes is 1800 grains.

PHOTOGRAPHY UPON COLLODION.

BY D. VON MONCKHOVEN.

CHAPTER IV.

THE SPREADING OF THE COLLODION UPON PLATE GLASS.

Before spreading the collodion npon plate glass, the impurities deposited on it must be removed, by means of a large badger-brush. A great deal of practice is necessary in order to obtain a uniform bed; there are two excellent ways of working, the one for plate glass of large dimensions; the other for ordinary sizes.

1. If the glass exceed the dimensions of 30 cent. by 40, it is placed upon a levelling stand, and after we are assured it is exactly level, a great quantity of collodion is poured upon one of the edges, which is held a little elevated. The collodion runs over all the glass; its equal extension is also favored by inclining it very slightly; then, raising it again quickly, the excess of the collodion can be made to run into a flask of a very large neck. An infinity of little wrinkles are then manifested, but they must be made to disappear by means of a contrary movement of the glass. The bed is then perfectly uniform. This operation ought to be very rapid, because the collodion dries so quickly, rendering the surface liable to be wooly. Immediately after this operation, the glass coated with collodion, must be plunged into the silver bath. If we let the bed dry too long, it will present, from the formation of the iodide of silver, a perfect transparency on the edges, while the middle would have a very decided opaline aspect ; and hence would cause inequality in the image. The collodion should only be slightly moist, or the bed will be separated in the silver bath. As soon as the wrinkles have disappeared, the bed is in a proper state to receive the actiou of the sensitizing bath.

It is partly on account of the difficulty of spreading collodion upon large glass plates, that the density of the collodion for views is diminished. In summer the density of the collodion must be diminished still more. Then there should be only one gramme of cotton to 250 *cent.* cubes of alcoholized ether. However liquid the collodion may be, it is always extremely difficult to obtain a pure bed upon dimensions exceeding 30 c. by 40.

2. For the medium sizes, and glasses of small dimensions, we make nse of a little handle, described by M. A. de Brebisson, in his excellent pamphlet. A thick glass must be fixed upon a piece of wood as a handle, by means of calico, whose edges, folded back, are pasted on the wood. In moistening the stnff a little, we can make the glass destined to receive the collodion,—only it shonld be done so that it exceeds in every case the handle by some *centimetres*,—so as to keep the collodion from running on the calico. The glass should hold it so strongly that it can be inclined without the collodion being detached. The operation is the same for glasses of large dimeusions. We do not extend this chapter; because, on the one hand, we suppose the reader is familiar with photographic manipulations, and because, on the other hand, we would recommend him to employ exclusively au apparatus described farther on. We will, however, observe,—

1st. That a collodion is too thick if the wrinkles should not disappear when the operation has been rapid, and when the collodion dries up fast, it is evident that the wrinkles cannot be smoothed.

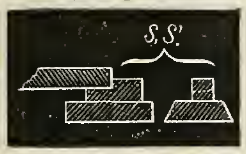
2nd. A collodion is on the contrary too liquid, if it is separated in the silver bath ; but we should remark that when a collodion is strongly iodized, the bed will always be detached; *for it is necessary that there exist a certain relation between the density of a collodion and the force of the iodization.*

In the first case, some alcoholized ether must be added to the collodion to make it more fluid; and in the last case, thick collodion (No. 1), must be added.

Lastly, the neck of the flask of collodion must be dried every day before pouring the liquid upon the glass; and the excess should run off iuto another flask.

TO SPREAD COLLODION UPON PLATE GLASSES OF ALL SIZES.

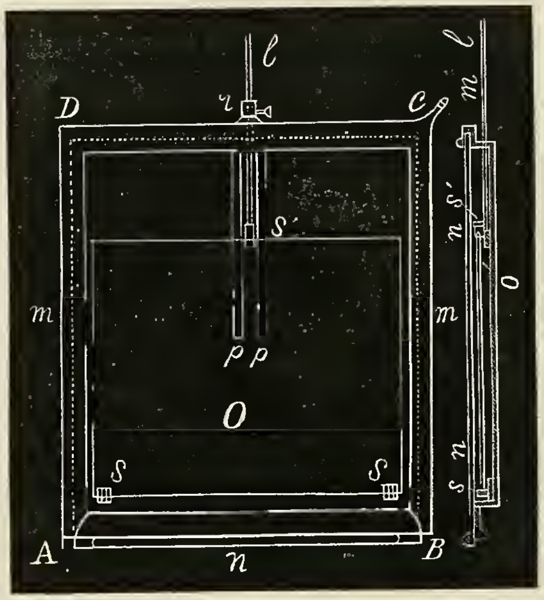
The extreme difficulty of coating glasses of large dimensions with a sensitized liquid in a uniform manner, has precluded them from being employed by photographers. If we could procure large glass plates entirely even, albumen could be easily applied,



but unfortunately they never have a uniform surface; so if we try to spread this liquid upou glasses of 56 by 80, we find the bed is thicker in certain places, which proceeds from inequalities upon the surface of the glass.

As it is the rapid drying of the collodion which makes the collodion bed wooly; if we could put an obstacle in the way of this evaporation, the collodion not being able to dry, might be spread on glasses of all dimensions.

It is npon this last principle, already applied with success by M. l'abbe Laborde, that the apparatus(figs. 1 and 2), is constructed.



A box A B C D, of red copper, of the form of a capsule of ordinary porcelain, has in its upper part a large groove of melted copper m m, in which slides a thick glass n, which serves as a cover, so that the apparatus can be opened and shut at will. At the bottom and near the edges are two copper *rests* s s, upon which rests, on one side, the plate glass o, destined to receive the bed of collodion; a third rest s, but moveable, is placed opposite. This last slides between two leaves of copper pp, and as it is attached to a stem l, which passes to the outside, it can be moved at will according to the size of the glasses, and it is fixed by means of a vice r. These supports should not extend beyond the upper surface of the glass, since when we would spread the collodion, the latter would run off with too much facility; it is therefore necessary that the glass should be held only by its lower edges.

(The soldering should not be done with the alloy of lead and pewter generally employed, but must be made with copper also).

Lastly, the box being finished is polished inside carefully; then covered over again with a thin bed of silver. In C is a little cock of glass, or better, a tube of red copper plated that can be shut at will with a glass stopple.

Iron, zinc, aud even copper are attacked by the collodion; the first attempt we made was with an apparatus of zinc, but the collodion sensibly injured this metal.

Wood cannot be used; in the first place, because the heat makes it dilate nnequally, and also because the ether and alcohol penetrate it easily; and lastly, because it is too difficult to clean. Besides the apparatus would be much too heavy for a manipnlation so delicate. It is especially to the copper grooves

that we should give all our attention; they should be perfectly *plane*, so that the cover may hermetically close the apparatus; we should also make the box as shallow as possible, (two *centimetres* are more than enough). To make use of this apparatus, we must begin by fixing strongly upon the supports the glass destined to receive the bed of *collodion*. We place it afterwards level on the *table*, and pouring into it some drops of ether, we shut down the cover to saturate the inside air with vapor of ether. We wait about one minute, then raising the cover one-half, pour rapidly upon the glass a quantity of collodion sufficient to cover it; it must be shut immediately, to avoid the evaporation of the collodion (this last operation should be as rapid as possible).

The collodion is spread over the whole surface of the glass, and when at last the latter is entirely covered, we leave it to drip for two or three minutes, the collodion not evaporating at all. Then taking out the stopple, which closes the tube, we let the excess of the collodion run off into a flask.

Proofs obtained with glasses, coated with collodion in this manner, are of a fineness truly marvellous, rivalling the albumenated glasses. This apparatus therefore, has incontestable advantages; for we spread the collodion with the greatest facility without appreciable loss, and the bed is of a perfect equality and protected from the dust.

We recommend the use of this instrument even for glasses of the medium size. The operator will be satisfied with it beyond his expectation.

CHAPTER V.

OF THE SENSITIZING SILVER BATH.

The collodion which covers the plate glass should be sensitized in a solution of the salts of silver. We use for this, azotate dissolved in ten times its weight of distilled water. But to obtain the greatest rapidity, the silver bath should be prepared as we shall indicate very particularly.

The sensitization must be made in darkness; in a dark chamber, where a feeble yellow light prevails, that can be obtained by letting the light enter by a little reddish yellow glass not more than a square *decimetre* in size. For collodions in which there is no brome, we can increase the light, because the yellow ray has very little action upon the iodide of silver, but with the bromide of silver the bed is impressible. It is proved by subjecting the sensitized glass to the action of a lighted candle, at a little distance from the flame: the glass immersed in the sulphate of iron becomes entirely black. For direct positives the light should be still feebler, if we would not have the proofs entirely veiled, (as it is well known the collodion includes a bromide). The most favorable light is that transmitted by a colored screen, formed by two glasses; one yellow and the other red. An orange light then prevails in the apartment, which scarcely effects the sensitized bed. Some say that the yellow light does not affect the iodide of silver; this is not so, as it can be seen by exposing the sensitized glass before a tile of that color, when it will be very strongly impressed.

Blue and violent rays act most strongly on iodide of silver; also these colors are obtained with difficulty in their true tones, at least by mixing chlorine with the iodine in the collodion. We will observe, in passing, that the iodide of silver is impressed even in the most absolute obscurity, under the influence of *invisible* rays; but this is not the place to speak of those singular phenomena which belong to the department of physics.

For a long time little vertical basins have been used in sensitizing glasses coated with collodion. We do not employ them, in the first place because they require too large baths, also because the gutta-percha, like all organic bodies, decomposes nitrate of silver,* even in the dark. We can try vertical basins of glass which are closed like flasks, and which are much preferable. We can also use porcelain basins, which do not in any way adulterate the silver bath, are cleared with facility and do not waste the liquid. Besides, porcelain basins can be advantageously used in all baths. The basins are placed perfectly level, and the solution of nitrate of silver is poured in, about a *centimetre* in depth. The glass is plunged into it, the collodion bed being below. We owe to one of our friends a little instrument of which we make daily use to accomplish this. It is a kind of hook of whalebone, that is easily bent in the flame of a candle. The glass rests upon the bent extremities; the right hand holding the apparatus at the curve, we plunge it in the bath at one motion, avoiding the slightest hesitation or rest.

The bed becomes of a milky white, because the alkaline iodide of collodion passes into the state of iodide of silver.

If, after an immersion of some seconds, we raise the plate, we shall remark that it presents an oily appearance and that it is not wet, in a uniform manner by the azotate of silver. On the contrary veins are formed, which must be made to disappear, by successively raising and lowering the glass in the bath. When at last those veins have disappeared and the liquid runs uniformly on the surface, we let it drip some seconds, then placing it in the frame it is immediately exposed to the light. The bed cannot be whitened too promptly in the silver bath; the opacity must be manifested gradually, or this would be the index that the bed would be subject to being detached, or rather that we had plunged the glass into the bath when the collodion was already too dry.

The collodion for direct positives presents a very transparent milky bed, while the collodion for negatives gives a very thick bed, because it is more strongly iodized.

In the chapter that precedes this, we have said that a certain relation must exist between the quantity of gun-cotton that the collodion contains and its force of iodization. If we make the collodion very fluid, and if it has much iodide, the fibres of *pyroxyline* would not have sufficient tenacity to maintain that great quantity of iodide of silver. In consequence of the ebullition caused by the ether at the surface of the sensitized bed, the latter would be detached in scraps.

The same proportion of iodide that exists between the collodions for positives and negatives, must be preserved for the same reasons in the silver bath.

It is essential to work in one bath only with the same iodides, or the effects are changed; also not to employ iodides of potassium, of cadmium, of ammonium, &c., in one bath, but if we would make attempts upon these iodides, to make use of special baths. In the case of such experiments, we ought not to work upon more than a quarter of a plate, which requires a bath of only 50 *cent.* cubes.

To compose a silver bath for negatives, take—

Distilled Water	1000	grammes.
Nitrate of Silver, dissolved	120	"
Iodide of Cadmium, or of Silver, well washed	5	"
Bromide of Cadmium, or of Silver, well washed	6	"
Pure Alcohol cent. cubes	10	"
Ether, cent. cubes	10	"

The addition of the alcohol and ether to the silver bath, is not strictly necessary to obtain negatives with pyrogallic acid; but for direct positives the use of these bodies is extremely favorable. (See farther on).

The flask must be strongly agitated to mingle the different substances, the precipitate must be left at the bottom of the flask for a reason that we shall give further on.

For rapid positives we vary the silver bath so as to have only 6 or 8 grammes of dissolved nitrate of silver for 1000 of water: the proportions of the other substances are preserved. If the positive images are desired to be very fine and very transparent, we add 10 cent. cubes of acetic acid. Crystallisable by a *litre* of the silver bath, but we also diminish the sensibility.

We have been brought to use these formulæs from the following considerations:

We employ the dissolved nitrate of silver because it is strictly necessary in order to obtain rapid negative images, that the collodion and the silver bath shall be neutral. If the collodion is red, it is a certain proof of its acidity; the immersion in the silver

* This is the reason the baths grow yellow, after some usage. This yellow color causes no marked disadvantage, but the gutta-percha has most vexatious effects, too long to be detailed here.

bath, of the glass coated with this collodion, wonld liberate some nitric acid; but, as the acids retard the rednctive action, it is necessary to employ neutral baths. However, for very fine positives, experience has demonstated that acetic acid gives much fineness and transparency to proofs; and we can employ it for this object; but, we repeat it, it slackens the luminous action. Besides, it is probable that the acids play a peculiar part in the silver bath, and that the loss of sensibility is due to another cause than the delay that they cause in the reductiou; but hitherto this cause has not been discovered.

Some persons, who would have the silver bath acid, (reddening turusol paper) think perhaps to neutralise it by a base, and make use of ammonia for this. This wonld be a grave error; for this bath would make a singular failure, becanse the iodide of silver would be decomposed without the intervention of light, and the proofs passed through the sulphate of iron would present a black surface without any appearance of an image. Instead of ammonia, use shonld be made of oxide of silver, wet, being just precipitated and well washed; this shonld be left for some hours in contact with the silver bath. The excess of acid combines with oxide of silver to form a neutral salt.

We have afterwards augmented the dose of nitrate of silver for negatives, and on the contrary have diminished it for positives, because the reduced silver of the uitrate, during the reduction, being carried upou the impressed iodide, it is evident that if the nitrate of silver is concentrated, there will be a great qnantity of reduced silver, and the image will be vigorous; but if, on the contrary, the nitrate of silver is feeble, the image will be ouly slightly marked. For negatives, a much longer exposure will be necessary than for positives, because more time is necessary for the light to penetrate and decompose a thick bed of iodide of silver, than to impress a bed extremely thin.

We have added the iodide and the bromide of cadmium, which gives birth in the bath to iodide and bromide of silver; these bodies are partly dissolved in the nitrate, and as the latter dissolve as much more of it, the more azotate of cadmium is introdnced into it, it follows that we must leave the precipitate at the bottom of the flask. It is advantageous and even necessary to dissolve previously the iodide and bromide of silver in the sensitizing bath, inasmnch as there would be glasses coated with collodion which themselves might furnish from their iodide enough to saturate it, so that with a new bath we should obtain negatives with difficulty.

The silver baths of which we have given the formula, cannot be used till 48 hours after their preparation, that the iodide and bromide of silver may have time to be partially dissolved.

Ether and alcohol are added to give to the sensitized bed, on going out of the silver bath, a fat property, which prevents it from being impregnated by the water, so that the sulphate of iron may not wet the bed. The image so formed is extremely pure and fine. This effect is especially precious for direct positives. These bodies on a pinch can also be suppressed in a bath exclusively destined for negatives.

It is well to maintain this bath of silver very pure, to avoid dnst and impurities, by filtrating them every time they are nsed. It is more important still to keep them from coutact with organic bodies, especially from those which contain sulphur.

If an old bath gives no more negatives, it is not necessary to make a new one, but only to add to it some dissolved nitrate of silver, in whatever proportion may be sufficient to give intense shades.

We should not forget that the iodide and bromide of silver shonld always be found at the bottom of the flask; if they should disappear, to be transformed into slight crystalliue needles, it is necessary to add bromide and iodide of cadmium. Should the color of the silver bath become at length yellow, it is no matter. Our silver baths are of a beautiful green because we do not free the silver from copper in the preparation of the nitrate. To prepare this last, we dissolve coined silver in nitric acid, and heat it to fusion.

We have discovered that the nitrate of copper has no effect, hence it is nseless to make a long process to obtain clear solution of nitrate of silver melted white.

(*To be Continued.*)

THE COLLODION PROCESS.

BY THOMAS H. HENNAH.

1. The great and increasing interest so generally taken in photography, particularly in the most recent and beautiful process of all, that by collodiou, has induced the author to give a few directions which, as the fruit of long experience, he trusts will enable those who desire to practise this valuable art, to obtain with certainty most beautiful pictures, capable of multiplication to an unlimited extent, and of surpassing delicacy and truth.

2. From the conviction he has for some time felt that most of the difficulties complaiued of by beginners are of their own making, and owing more to ignorance of the proper method of manipulation to be pursued than to any other cause, he is sanguinc that if his directions are as faithfully followed as they are honestly given, they will be the means of helping many to a like success with his own; and while affording a means of useful and facinating employment, will place at their command an art, the resources of which in aid of the artist, the antiquary and the naturalist, are as inexhaustible as they are, comparatively speaking, unappreciated.

3. He would not be understood as claiming the merit of originating the whole course of manipulation here given as being most conductive to success; for from the progressive nature of the subject, he has been obliged to avail himself largely of the labors of others who have bestowed much time and attention upou it; all that he has attempted has been to give in their plainest form, and in good faith, those methods which a course of careful experiments and successful practise, pursued for some time past, has enabled him to point out as reduciug the collodion process to a state of absolute certainty.*

4. Should any oue be inclined, however, to find fault with the manner in which apparently trifling details are dwelt upon, he is reminded, that by following and applying the directions given, even those who are novices are almost sure of success, while those who neglect them unnecessarily throw discredit upon their persuit and upon themselves by their failures.

5. The agent by means of which, from its extreme sensitiveness to light when properly charged with certain of the salts of silver, such beautiful pictures are to be obtained, has not been long known. It is a solntion of gnn-cotton in a mixture of ether and alcohol; and as all photographers ought to know how to prepare it for themselves, the following methods are subjoined. Before procecdiug, however, the writer would premise that the opinions as to the different methods of iodizing, &c., are not hastily expressed, and that every formula has been put to the test of repeated and careful experiment; but still, owing to the uncertainty inseparable from all things with which time, temperatnre, or manual skill have much to do, it is impossible that the same results may not follow the same course of praceeding with any two experimenters, indeed to so great an extent in this the case, that persons accustomed to the sight of photographs can generally distinguish the productions of particular operators by pecnliarities of manner, which, considering the simple nature of the process, it seems scarcely possible should be manifested. Forbearance should, therefore, at all times be shown to those who attempt to teach, although it may be unsuccessfully.

PREPARATION OF THE SOLUBLE COTTON.

6. *First Formula.*—Powder, *coarsely*, 8 ounces of pure crystalized nitrate of potash, and after that placing it in a basin or broadmouthed stoppered bottle, add to it three quarters of an ouncc (6 drams) of water, and pour upon it ten measured ounces of pure sulphuric acid. sp.g. 1·840, then when it has been stirred with a glass rod, to ensure it perfect mixture, immerse in it, without delay, by the same means, a quarter of an ounce of clean carded cotton, by a small portions at a time, taking care that the whole is thoroughly and intimately mixed together. Immediately after which immerse the bottle or pan in a

* It is with regret that the writer feels compelled to qualify this statement; there are, however, occasionally instances of failure arising from remote causes, which perplex even experienced operators, and which, while rendering it interesting, take it out of the domain formerly assigned to it.

basin of hot water heated to 130° or 140° Fah., so as to keep up the temperature of the mixture. When it has remained at rest from ten to fifteen minutes, remove the cotton by the means of glass rods, into a large vessel of water, and by stirring briskly, and renewing the water repeatedly until it has no perceptible taste, wash out the whole of the acid and every thing soluble; then wring it in a cloth, and, after loosening it by pulling the flocks apart, dry it by hanging it up in a net where it can be exposed to a current of air, which will be found a much better method than by employing artificial heat.

7. The pure acid is recommended on account of its being easily procured of known strength. The object of the addition of water to the nitrate of potash is to reduce the strength of the acid, and at the same time to take advantage of the increase of temperature, which is always caused by the mixture of water with strong sulphuric acid.

8. If red bubbles or fumes of nitric oxide are disengaged in the mixture, as will sometimes be the case when the cotton has been pressed too closely together, it must immediately be stirred with glass rods, which will generally put a stop to the action. The cotton is not so good when this gas is set free; we should be careful to avoid it as much as possible by seeing that each addition of cotton is well imbued before more is put in; we should also carefully avoid using too much cotton.

9. If the first water is previously made as hot as the hand can bear, it will act much more thoroughly than if cold, the sulphate of potash formed in the process being but slowly soluble in cold water.

10. The time taken in washing out the acid, &c. (particularly the first wash), influence greatly the solubility of the cotton, and its fitness for photographic use. If it is allowed to remain in either of the first two waters, or if it is dried slowly, it will, in all probabilty, produce an inferior collodion and be unequally soluble, while if the waters are quickly changed, and it is dried rapidly, it should dissolve in a mixture of five parts of ether, sp. g. ·720 (washed), and one of alcohol, sp. g. ·8320(60° over proof) with scarcely any residue; and the collodion should be so tough as to allow of its being rolled off the glass without difficulty, that is to say, before the addition of the iodizing solution. If properly prepared, that is, if the nitrate of potash is pure, the acid of the proper strength, and both well mixed, the temerature properly maintained, the cotton thoroughly imbued, and afterwards carefully and quickly washed and dried, the film produced by the evaporation of its solution in alcoholized ether should be perfectly equal and transparent in appearance, and quite free from marks, or crape-like lines, even when almost dry.

11. To the influence of imperfect and slow washing and drying, the writer believes, is due most of the difference observed between cotton prepared in large and small quantities. An experimental portion is probably prepared in small quantity, the washing and drying rapidly and thoroughly performed, and the product is quite satisfactory; but upon carrying out the process on a larger scale, this *thorough* operation is not so practicable, and the result is not so good

12. *Second Formula.*—This, which is a modification of one kindly communicated to the writer by Mr. Williams, is, from the nature of the materials employed, much more uniform in its product, and (particularly by the amateur) capable of being put in practice with more ease and less risk than the first.

13. Take of pure sulphuric acid, sp. g. 1·840, 6 measures; colorless nitric acid, sp. gr. 1·440, 4 measures; fuming red nitric acid,* sp. g. 1·460, 2 measures; and of water, 1 measure. These are to be placed in a broad-mouthed stoppered bottle, and Swedish filtering paper is to be immersed in it, in the proportion of 12 grains to every measured quarter of an ounce of sulphuric acid in the mixture. It is to remain in mixed acids twenty minutes, and then to be quickly washed† and dried as was recommended for the cotton.

14. If this is all carefully done as directed, and no waste is allowed, the paper, when dry, will be found to have increased in weight nearly 75 per cent., to have assumed the crispness and appearance of parchment and, from being perfectly insoluble, to be as perfectly soluble in the mixture of alcohol and ether.

15. To prevent the paper matting together, and to facilitate the equal action of the acids upon it, it should, previous to immersion, be cut into strips about an inch broad, and then crimped across in this manner

16. Whichever these methods is followed, the operation must be conducted either out of doors, or in some place where the acid fumes (which are copiously generated and are exceedingly injurious if inhaled), can be immediately carried off. The hands by coming into contact with the mixture, would be stained yellow; glass rods should always therefore be used in moving or stirring the cotton or paper. The smallest quantity falling on any article of dress would produce a hole in a short time; and even the first two or three waters in which the cotton or paper is washed would stain, and in time destroy, anything upon which they may be splashed; on this account the whole should be thrown away as soon as it is done with.

17. In making choice of the cotton (or paper), the operator should have in view the particular purpose for which he requires it; that is to say, wether he wishes to keep it on glass, or transfer the film to paper or wood after receiving the image. If it is to be transferred, cotton *perfectly soluble* should be used, from the facility with which it leaves the glass; but for beginners, or when it is to be kept on the glass, either cotton that is *not entirely soluble*, or paper that is soluable with difficulty, is the best. As far as the writer's experience goes, he believes that in most cases those collodions prepared from *imperfectly soluble* cotton (or paper) become attached to the glass with tenacity, while those in which a perfectly soluble cotton is employed are with more difficulty kept from working up from the glass. The last remark refers more particularly to *cotton* than *paper*, the difference is, however, only in degree. The amount of adhesiveness being materially influenced by the quantity of alcohol present; this may, however, be accepted as a general statement of the difference between soluble and partially soluble preparations.

PREPARATION OF COLLODION.

18. A mixture is to be be made of 5 measures of washed ether, and 2 of alcohol, sp. g. ·832, and to each measured ounce of the mixture from 3 to 6 grains of prepared cotton or paper are to be added, shaking the whole together at intervals until a solution is obtained, which, if the cotton is good, will be very quickly.

19. The ether and alcohol must be perfectly pure, and when procured should be kept in stoppered bottles, as from the readiness with which they dissolve oils and resinous bodies (both exceedingly hurtful), they are very likely in the course of manufacture and afterwards, to be rendered unfit for photographic use.

20. Ether that has been kept some time gives a better collodion that when newly prepared, although when iodized it sooner acquires color from the liberation of iodine.

21. Alcohol of the strength named (sp. g. ·832, or 60° over proof) can be easily procured, but when stronger there is more difficulty.

22. No exact proportion of cotton can be specified on account of the varying solubility of different samples, and also for the reason that a different amount of thickness or vacidity is produced by equal weights of almost every seperate preparation.

23. A stock of this plain or uniodized collodion may be prepared sufficient to last three or four months, as it will by standing become clear, and be always ready for immediate use; much beyond this time it will (*if originally fit for photographic use*) not keep good, and those who are unfortunately tempted to lay in a large stock to use abroad, &c., will find themselves sorely disappointed when they attempt to use it. It becomes *short*, and wanting in continuity, producing a granular and poor film, incapable of receiving definition. The writer does not say this from limited experience, he having tried collodion from almost every house in London, which, he has had by him for some time, and which in every instance, without exception, he found perfectly useless.

*. Frequently called nitrous acid.
† In this case cold water will do.

He speaks thus plainly, to avoid the loss and disappointment which must be felt severely by those proceeding to a distance, relying npon its remaining uniform, and finding that, perhaps, after a long journey has been taken with a view to its use, the main object is frustrated by it failure, when no means are at hand to replace it.

24. By whichever means the collodion is prepared, it is to be iodized, or made useful in photography, by adding to it the following solution in the proportion of one dram (fluid) to seven of plain colloion:—

Alcohol sp.g. ·832............ 1 fluid ounce,
Iodide of ammonium............30 grains.

These are to be mixed together in a stoppered bottle, and, by shaking at intervals, a solution will be obtained, which should be filtered through bibulous paper, and, as an additional precaution against the entry of insoluble matters into the collodion, the bottle in which it is kept should not be disturbed for some time before any is removed for use; in fact, this precaution is most necessary, both with regard to the iodizing solution and the collodion, if very rapid action is required, as it completely prevents the necessity of waiting, after iodizing, for the collodion to become clear previous to use, and so, by enabling us to avail ourselves of the extreme sensitiveness of newly iodized collodion by using it at once, affords us the opportunity of securing many portraits of children and representations of moving objects which could not in any other case be obtained.

25. The sensitiveness of collodion is found, in every instance, to diminish slowly but steadily from the time of its being mixed with the iodizing solution, but although pictures are produced rapidly in proportion to the newness of the collodion, the same perfection of finish and tones is not, with some kinds, so easily reached at first, as when a day or two is allowed to intervene.

26. The influence of this change on the character of the pictures produced is worthy of the closest observation; and as to the novice in photography example may be better than precept, the writer will repeat from a former edition one of the instances which occurred to himself. He took on the same day, as nearly as possible at the same time, two pictures, to one of which he gave two seconds exposure, to the other forty, and in both cases the results were eqnally good. Now, the only difference in the preparation of the glasses was, that for the first, collodion only three days old was used, while that used for the second had been mixed more than six weeks. It is necessary to add that both samples of collodion had been prepared in the same manner and from the same chemicals.

27. When the operator is without experience in the working of his collodion, he will save time, temper, and materials, if, in the first instance, he takes two pictures of the same object, giving to the first, if the light is tolerably good, from one to four seconds exposure, and to the other from thirty to forty. The difference of their appearance after, and while developing, will be the best guide to the time to be allowed in future trials

28. Much error has arisen from this fact of the varying sensitiveness of collodion, and the great difference of result according to the length of exposure to light. To these causes the writer attributes the conflicting opinions expressed on the merits of different iodizing and bromizing solutions, and their power of rendering half tones perfectly, the fact being, that by giving a short and a long exposure to the very same collodion, either a perfect absence, or as complete a superabundance of half tone, is obtained in the photograph, and when a comparison has been instituted, in nine cases out of ten, the experimenter has either been led away by novelty or the iodized collodion has not been quite fresh, while the bromized has, on the contrary, been perfectly so.

29. In this view of the matter the writer is confirmed by many comparative experiments, and from them he is led to believe that, although, perhaps on the score of rapidity of action, the balance slightly inclines to bromized, it still possesses so many defects, that it connot bear comparison with iodized collodion, and that for all cases of portraiture or general use, where uniformity of action is desirble, the formula he has given for iodizing is as perfect as any at present known.

30. The difficulty of obtaining good iodide of ammonium experienced formely, is now no longer a reason for preferring the potassium salt, and although too unstable for the purpose of those who make large quantities of collodion for sale, it is much the most satisfactory to the practical photographer. Its general working is much more equal, and a finer finish can be obtained in the negative than by the means of other salts. Another reason for giving it the preference over the potassium salt is, that when its decomposition is brought about in the bath, nitrate of ammonia results instead of nitrate of potassa. The reason for preferring the former of which will be mentioned when speaking of the bath.

31. The method proposed by Mr. Crookes for restoring the sensitiveness of old collodion and preserving that of new, by immersing in it a piece of silver foil, is as valuble as it is simple. Collodion becomes slow in action principally from the liberation of free iodine by the decomposition of the iodide of potassium contained in it. Metallic silver combines readily with free iodine when brought into contact with it, forming iodide of silver, which is soluble in a solution of iodide of potassium, and as the object of iodizing collodion is to enable us eventually to form an iodide of silver, it follows that, instead of anything being lost by the combination of the iodine with the silver, our work is in fact anticipated, and that in proportion to the quantity of iodine liberated, combined with silver, and again dissolved by the remaining iodide of potassium, so is the quantity of silver required from the bath to excite the plate diminished. It has lately been suggested that zinc might advantageously be substituted for silver, on account of the iodide of zinc, formed by the action of the iedine in the collodion upon it, being soluble in alcohol, instead of an iodide of silver, which is only soluble so long as there is sufficient unchanged iodide of potassium to dissolve it. Although in theory the foregoing holds good, it does not in practice appear to be of importance which is used, for with neither can old collodion be made to equal new, as is asserted, nor can the relative expense of the two methods be brought in question, the silver costing in the end no more than the zinc, all that is lost in the collodion being, as aforesaid, saved in the bath.

32. Unfortunately, however, these, like many other good remedies, go a little to far. It is necessary to the perfect working of collodion that a minute quantity of free iodine should be present in it, on account of its power of preventing fogging or cloudiness, and in practice it will be found necessary to add sufficient tincture of iodine to effect this; generally, for negatives, about a drop to an ounce of collodion will do, or if for positives two or three drops, but it must be remembered that it is only in case of the *complete removal* of the iodine (which may be known by its losing the usual yellow tint), that this addition must be made; at other times it will do more harm than good.

33. A remarkable and almost unaccountable difference is commonly observed in the degree of sensitiveness to light of different samples of collodion indepeudently of the iodizing solution used, and it is believed that more remains to be done in the preparation of a *good collodion*, irrespective of sensitizing solutions than in any other branch of the process, for there is no doubt that most of the superiority of this over other methods is due to the little understood qualities of the collodion itself. When prepared apparently under the same circumstances, iodized in the same manner, and at the same time, in one instance so much as four times the exposure was required for one than another; and what is also remarkable, the least sensitive has invariably been that which most slowly showed the color due to the liberation of iodine. It was for this practical reason that the writer, on a former occasion, did not entirely concur in Mr. Crookes's observations, a proceeding which, he has learned, excited some surprise at the time, although since warranted by the experiments of others, leading to the conviction that too much stress has been laid upon the benefit to be derived from using collodion free from iodine, when rapidity of action is sought after. It is doubtless of consequence that much should not be present,

but the writer believes that to some hitherto hidden cause must be attribnted the rapid diminution of sensitiveness observed in collodion after its being first iodized. He has frequeutly added a large proportion of tincture of iodine to newly-mixed collodion without materially altering its action in any other way than in the production of clearer negatives. It must not however, be forgotteu, when considering these statements, that the condition of the exciting bath may at one time render necessary an alteration in the collodion which at another might be hurtful.

34. It may be expected that something should be said as to the use of iodide and bromide of iron in collodion, but the writer has to confess to a complete failure in all his attempts at making a practical use of them; as, however, many whose names he respects much, have spoken in their favor, he can only attribute to his own carelessness or want of skill the difference of his results from theirs, and must leave to other hands the task of working out their theories.

35. Mr. Shadbolt has added to the list of thoroughly useful and practical suggestions, for which photographers are indebted to him, one for the use of chloroform in collodion for the purpose of making it more sensitive, and at the same time considerably enhancing its power in rendering half tone.

36. It is to be added in the proportion of twenty to thirty minims to each ounce of collodion. In the writer's experience, it has increased the rapidity of his collodion at least one half, but, except in the case of having a collodion which give hard and intense negatives, he thinks the above proportion too great, from ten to fifteen being sufficient, the larger dose lowering the intensity so much that the resulting proofs are wauting in vigor and brilliancy.

37. As collodion is the only requisite to the photographer, upon the preparation of which many observations will be made, the writer trusts that he will be excused for the space he has given it, and will proceed at ouce and more briefly to the consideration of what remaius.

CHOICE AND PREPARATION OF THE GLASS.

38. Glass known in commerce as "patent plate," should be chosen, free from scratches, perfectly even, and well polished, theu after having cut it into squares, so as to fit easily into the camera frame, the edges should be roughly ground, in order that the hands may be protected from injury, aud that the adhesion of the film of collodion to the glass may be rendered more perfect than it would be without this precaution; indeed, with some samples of collodion prepared from cotton, it is almost impossible on ungrouud glasses to keep the film perfect through all the washing it has to undergo, the water making its way underneath, disturbing it completely, and of course rendering useless all previous care and trouble (if such a work can be admitted by a photographer.)

39. The necessary articles for cleauing the glasses are a few linen cloths (fine diaper is the best material, from its being more free from flue than other kinds), an old piece of cambric and a mixture of tripoli powder with alcohol, of the consistency of cream, to which may be added a small quantity of ammonia, and what may sometimes be found even better, a mixture of cyandide of potassium with tripoli powder, in the proportion of cyanide 1 dram, water 1 ounce, aud sufficient tripoli to bring the mixture to the consistency of cream.

40. The cloths should be scrupulously cleansed from all impurities by boiling them iu a solution of common kitchen soda, and theu washing them several times in clean water, care being taken to avoid the contact of grease at all times. Wheu thus prepared, they shonld be carefully kept from those used for wiping the frames, &c., and should not be used for any other purpose than those for which they were first appropriated. In fact, as it is upon perfect cleanliness that success so much depends, so is it impossible to carry attention to it too far, if we are desirous of overcoming quickly what might otherwise prove a difficnlt and tedious task.

41. The best method of cleansing the glasses is the following: —Pour a small quantity of either of the above mixtures upon the glass, and with a tuft of cotton tied up into a ball, or a roll of soft linen rag, rub it well over both sides, then either hold it under a tap or rinse it in a basin of clean water, and before it has time to dry spontaneously rub it well with one of the prepared cloths until all moisture is removed, and finish with a perfectly dry cloth, in which it must be held all the time, so that the hands may not come in contact with it.

42. By breathiug occasionally upon the glass, and holding it so that the light may strike it obliquely before the moisture of the breath has quite evaporated, you may readily ascertain if it is sufficiently clean; the streaks or stains can be thus at once perceived, and may be removed by breathing hard so as slightly to moisten the glass and again rubbing it with a dry cloth. When the marks of the breath disappear smoothly and evenly you may be sure that the glass is clean enough; all that is then necessary is, just before coating the plate, to remove, with the piece of cambric, any dust or flue which may be npon it.

43. For small glasses the foregoing method is easily pnt in practice, but for large ones some precautions must be taken to prevent their being broken by the rubbing they have to undergo.

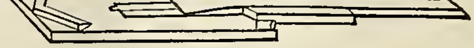


Fig. 1.

44. The little piece of apparatus represented in fig. 1, the invention of the late Rev. T. Meylor will be fouud most convenient as a means of avoidiug such an accident. The plate is to be laid upon it, aud while one end is held under the bevel at the broad end of the board, the sliding piece of wood is pressed in until the glass is held firmly; to ensure which, the slide is belled at the end, and is made to move with sufficient friction to prevent its slipping while the plate is being cleaned. When the operation is finished it is merely necessary to withdraw the sliding tongue, and the glass will be released. The glass may of course be washed and roughly dried before placing it on the polishing board.

45. Additional care is requisite when positives are being worked for, mauy trifling stains which would not be noticed iu a negative being then made very visible. It is therefore better to give the preference to the cyanide mixture in this case, and after drying the glass, to finish with a little dry tripoli and a piece of linen or cambric quite free from grease.

46 After having taken a picture by the progallic process, nothing but clean water is required for cleaning the glasses; bnt in every other case, notwithstanding what has been said to the contrary, no reliauce can be placed upon cleaning with simple water, particularly when the glasses are new. If ammonia is used for cleauing it must not be in the same room in which the plates are rendered sensitive, for if present in the atmosphere aud a bath is in a condition to work well and rapidly, it is almost sure to cause a blackening of the film when it is developed.

COATING THE PLATE.

47. This operatiou influencing so materially as it does, by the mauner of its performance, the character of the finished picture, is so purely a matter of delicate mauipulatiou, that although very easy in practice to those who have ever seen it done, is, like most thiugs requiring manual skill, much more difficult to teach by precept than example, and although in the following directions the writer has eudeavored to render intelligible to the beginner the method he thinks the best, he would nevertheless advise those who have the opportunity to get a little *viva voce* instruction from a friend as the best means of saving both time and collodion.

48. Hold the glass horizontally in the left hand by one of its corners, and pour the collodion on to the centre, using a quantity sufficiently great to spread easily over the whole surface, by giving to it a movement of rotation; that is to

say, incline the plate, so that the collodion may flow gently first to corner No. 1, then No. 2, then No. 3 (if possible avoiding the thumb), and then to No. 4. When the surface has been thus perfectly covered, return into the bottle from corner No. 4 all the superfluous collodion, raising the glass steadily, so that it may be vertical, in a line drawn from 2 to 4, fig. 3; then by raising corner No. 4, cause the lines formed in the collodion by the draining to run into each other, and leave an even surface, after which, return the glass to a horizontal position for a few

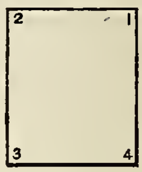


Fig. 2.

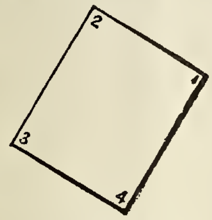


Fig. 3.

moments. The principal difficulty in the way of getting a perfectly even film is unnecessary hurry. If the glass is raised quickly to return the excess of collodion into the bottle, it is quite impossible with after care to make it even, and it will be found more economical to sacrifice the small quantity of ether lost by evaporation than to spoil a negative by allowing insufficient time. If a small bottle is used, say a one-ounce, when plates 5 by 6 are being coated, the deterioration of the collodion by the loss of ether is practically not worth notice, as when it becomes half empty it can be again filled up until it becomes too thick to flow easily, when a small quantity of pure ether may be added to thin it.

49. Some very experienced operators prefer draining from the opposite corner to that held (No. 1), but there is then the chance of any dirt or impurity upon the finger being carried right across the plate, while by the foregoing method it is retained at the edge.

50. When the glasses are so large and heavy as to be difficult to manage without some support in addition to the fingers, they may be easily coated by resisting corner No. 1 on the edge of a table or other convenient support in the manner represented in fig 4.

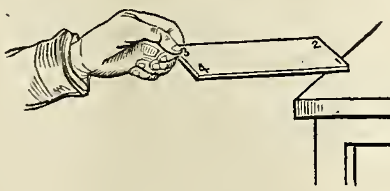
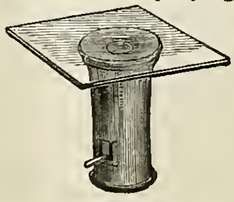


Fig. 4.

51. All necessary alterations of position can be made with ease without removing the corner from the table, and it will be found that the directions given above will apply equally whether a support is used or not.

52. There are also many different kinds of plate holders recommended, of which that represented in the accompanying cut is by far the most efficacious.



The plate being laid on the top (A) which is edged and lined with caoutchouc, is secured by pushing the lever (B) into a catch placed lower down, and so causing a partial vacuum. It may be immediately detached by liberating the lever from the catch.

53. A frequent cause of the failure is the presence of small pieces of dry collodion on the neck of the bottle; these should be carefully removed for when suffered to remain they are carried by the collodion on to the plate, and there being partially dissolved cause large *striæ*, which inevitably spoil the picture.

54. Another precaution necessary to be taken when a large quantity of collodion is mixed at a time is, to preserve it in a large bottle and decant into a smaller one, a short time before using it, the quantity required for coating only a small number of plates. By this means the presence of the deposit which sometimes forms at the bottom of the bottle is avoided, and with it the spots upon the picture which it causes. When, however, the care recommended when speaking of the preparation of collodion is taken, that both the iodizing solution and collodion are quite clear before mixing, advantage can be taken of the extreme sensitiveness of newly iodized collodion, and sufficient only for present requirement need be mixed, there being little chance that this cause of spottiness will be met with.

55. The operator must not immerse the plate in the sensitive bath until the collodion begins to set or become firm. The time to be allowed for this varies, however, so much with the age and make of the collodion and the state of the atmosphere, that no rule can be given as infallible.

56. If the plate is kept too long before immersion, it will be unequally sensitive, those parts which were the most dry being least sensitive.

57. If the plate is immersed too soon, streaks and fringes, or, as photographers call them, curtains, will be observed proceeding from the edge of the plate at which the collodion was least dry. This is the most frequent error, and one more fatal to success than the opposite, but we must be careful in avoiding one mistake that we do not fall into another, but by observation learn the time suited to the collodion in use.

58. All the processes hitherto given may be performed by daylight; but in every subsequent operation, until the picture is fixed, the greatest care should be taken to exclude even the faintest ray of white light except that which acts upon the plate in the camera. The most practicable way of doing this is to cover the windows of the operating room with two or three folds of yellow glazed calico, light passing through a yellow medium having so little (if any) chemical effect that a large supply may be safely admitted, so much at least as to admit of all necessary operations being carried on with ease and comfort. It is a common error, and the cause of many failures and breakages, to suppose that our supply of even this light must be limited to barely enough to allow of our moving about.

59. Should the operator find it necessary to coat the plate by the light of a candle, he must be careful not to approach it too closely when doing so, the vapor of the ether contained in the collodion being highly inflammable. This caution deserves attention, several instances of severe accidents happening from its neglect having come to the knowledge of the writer.

EXCITING THE PLATE.

60. For this the following solution is required, in quantity proportioned, of course, to the size of the plate and the capacity of the bath:—

Nitrate of silver..........	40 grains.
Iodide of silver...........	to saturation.
Alcohol..................	30 minims.
Distilled water...........	1 ounce.

61. These must not be mixed directly together, but the following mode of proceeding must be adopted, which, although for eighteen ounces of solution, can of course be altered by a little calculation to any required quantity, the same proportions being observed:—Dissolve an ounce and a half of nitrate of silver in three ounces of water, and when a solution is obtained, add four grains of iodide of potassium and ammonium previously dissolved in half an ounce of water. This will precipitate iodide of silver,* which will almost immediately dissolve. When the solution has become clear again, add fourteen ounces of water, which will cause it to become opaque from the re-precipitation of the iodide of silver which has been added in excess for the purpose of saturating the solution completely, but which must be removed by filtration through white filtering paper. When the solution has all passed clearly through the paper nine drachms of alcohol are to be added.

62. When the alcohol and silver solution has been well mixed

* The small quantity of nitrate of potash or ammonia produced by this decomposition is of no importance.

by shaking and then allowed to remain at rest for twelve hours, in all probability on exciting a plate with it good negatives will be produced; if such is not the case, it must be tested with litmus-paper, and if any sign of acidity is shown, ammonia must be poured in, drop by drop, until the acid is neutralized, and a slight alkaline re-action is manifested;* then glacial acetic acid is to be added by two drops at a time, until the plate develop *clearly*. It may, however, happen that, instead of an acid re-action, there may be an alkaline one (see note at foot of page), which will have to be remedied by adding acetic acid as before stated. This latter fault, although much less likely to occur, is much more likely to be perceived by the beginner than the former, for with this he *cannot* get a picture, but with that he can. Neither of them, however, often occurs with a new bath, and the remedies, which would do more harm than good if not required, are proposed as remedies only, and not as necessary at all times.

63. The object of neutralizing any acid at first found in the bath is, to avoid the possibility of much nitric acid being present, the writer having frequently experienced its prejudicial effects on the production of negatives, while, on the contrary, acetic acid, when present in even larger quantities, is not so hurtful at all events; while ensuring *clean* negatives, it seems to diminish the sensitiveness of the plate but little, and for working out of doors, or in a strong light, is decidedly advantageous.

64. When, after neutralizing the free acid in the bath, the ammonia is added in a slight excess, a minute quantity of oxide of silver is thrown down, and this, when acetic acid is added, unites with it, forming acetate of silver, to the presence of which, with free acetic acid in his sensitive bath, the writer formerly attached much value on account of its effectually preventing, by its own decomposition, the presence of even a trace of nitric acid, so long as any remained in the bottle; and, although this opinion is now modified, he still thinks it may be beneficially employed, if not so indispensable as when he entertained a strong opinion against nitric acid even in minute quantity.

65. If the collodion is ordinarily good, negatives produced from a bath composed as above have great intensity, and the deposit forming the lights of the picture is completely in, instead of on, the film, and the negative will, if carefully used, yield many proofs, without being subject to injury, although unvarnished.

66. The addition of a small quantity of nitrate of ammonia is highly advantageous in keeping the surface of the bath and plates free and clean from stains, by its power from holding the oxide of silver in solution, as well as slightly accelerating the action of the bath; but at the same time the bath must always have an acid re-action, or it will itself cause the plates to blacken, the alkalinity, so much talked of lately, being in many cases (as pointed out by Mr. Hardwich), due to the solution of oxide of silver in that salt rather than to the presence of any of the alkalies simply soluble.

67. The *fogginess* so frequently complained of is, when not owing to light having reached the plate, often caused by the presence of bodies acting as alkalies, the remedy for which (after trying a stronger dose of acetic acid in the developing solution), is the addition of acid (acetic) to the bath, until the alkaline re-action is no longer recognized. The altered developing solution should however always be first tried; many failures of beginners arising from variation in the strength of the acetic acid sold in the shops, much of which is far from its proper strength, while most formulæ for developing solutions are framed on the supposition that really *glacial* acid is to be used. The fogginess is also, though not so often, caused by an excess of *nitric acid*, so diminishing the intensity of the negatives produced, that, in order to obtain any force, the development has to be carried on too long, that is, until a general reduction of silver takes place over the whole surface, the consequence of which is, that the negative is generally very inferior in quality, and the resulting positives wanting in all freshness and vigor. In this case ammonia must be cautiously added, until the negatives are produced both clean and intense—a drop or two will in most cases suffice; if, however, too much is added, a general blackening will take place.

68. If a bath has been in use some time, and old collodion containing much free iodine been excited in it, a large accumulation of nitric acid, liberated by the union of the iodine with the silver of the bath, will be found in it. This it is which gives rise to the state mentioned in the preceding paragraph, and which must be remedied as there pointed out. Beginners must not be deterred, however, by this statement from using collodion that has been mixed some time, for it is by the use of it in a nearly neutral bath that the best negatives can be most easily obtained, subject only to less rapid action than when a more recent preparation is worked with, and the slight inconvenience of having occasionally to remove the acid produced.

69. The characteristic of negatives produced from a bath containing nitric acid in any quantity is, besides transparency and want of depth, the greenish tint of the deposit when viewed by transmitted light whilst wet.

70. Sometimes a very remarkable and almost contradictory change takes place suddenly in baths that have been simply prepared, that is, without the addition of either acid or ammonia. The image on developing (if the exposure has been of sufficient duration for the production of a good negative, supposing the bath to be in good order) presents the anomalous appearance of an image in some parts positive and in others negative by transmitted light. Those parts which have received most light, such as white drapery, the face, &c., being positive (the reverse of the usual effect), while the parts least illuminated present the ordinary or negative appearance. These effects are accompanied by the disagreeable circumstance that, if we give an exposure sufficiently short to prevent the change in the lighter parts, we cannot get drawing into the darker ones.

71. It will also be found, by giving considerable excess of exposure, that the whole will become positive, and the problem of obtaining direct a positive image in the camera will be solved. The writer has not yet succeeded in controlling this change so far as to bring it about at will, anxious as he has been to do so; he hopes, however, soon to be able to succeed. At present it remains an useless because an unexplained fact, but although unable to point out the cause, it is satisfactory to be able to point out the remedy, which is no other than repeating that for an acid bath, adding ammonia in the proportion of six drops to sixteen-ounce bath, and taking an experimental plate; if it blackens on developing, sufficient has been added; if not, we must add more cautiously until that result is obtained. Then add acetic acid, drop by drop, until the negatives develope clearly.

72. The most valuable feature observed when this change takes place is that after the above correction the bath gives more perfect negatives than can be obtained either from a new one or from one which has been treated in the same manner, but which has not previously undergone the change in its properties. After correction we cannot again with any exposure bring about the previous effect of light and shade.

73. Nitrite of silver is a most valuable addition to the sensitive bath in the proportion of from ten to twenty minims of the saturated solution to each ounce of the bath.

74. The preparation used by the writer is not the pure nitrite; it is as follows:—Mix equal parts of nitrate of silver and nitrate of potash, and heat them gradually over a lamp in a porcelain crucible. The mixture will fuse as the temperature is raised; oxygen will be liberated, and the nitrate be converted into nitrite. For photographic purposes the heat must be raised and continued until bubbles of nitric oxide are liberated in small quantity, and a small quantity of silver reduced to the metallic state;† when cold the mass is to be dissolved in as

* An amount of alkalinity quite sufficient to blacken a plate on developing may be present without exerting any perceptible action on the test paper; it is better, therefore, to try plate by plate after every two drops, until the film, when developed, appears of a transparent reddish brown in cloudy patches, which is a sign that alkali is in excess.

† Giving rise, it is conjectured, to the formation of hyponitrate of silver, which, from the photographic effects of hyponitric acid, may be the active agent in producing the change attributed to the nitrite.

small a quantity as possible of distilled water, and the solution filtered for use.

75. The resulting negatives are very perfect in tone with an amount of exposure, which without it could scarcely be half enough. It however entails the necessity in some cases of using rather more acetic acid than usual in developing, to prevent its tendency to produce cloudiness.

76. A general tone of reddish brown pervading and *confusing* both lights and shadows betokens an alkaline bath; but if the alkalinity is only so slight as to be corrected by using more acid in the developing solution, much more beautiful negatives can be obtained than with an acid one.

77. The bath, or rather the vessel for containing it, is best made of gutta percha or porcelain (glass, on account of its transparency, is objectionable), and should be of sufficient width to allow of a large quantity of solution being used; the false economy of using narrow baths being one of the most frequent causes of that inequality and cloudiness observed in collodion photographs. For a plate 5 inches by 6 the bath should have at least the following dimensions:—$7\frac{1}{2}$ inches deep, $5\frac{3}{4}$ wide, and $1\frac{1}{2}$ across, and although a larger one is not actually required, still the larger (in moderation) that it is, the more will the equality and smoothness of the picture be promoted.

78. The dipper of which, with the bath, (a cut is appended, Fig. 5), should be made of plate glass, a small slip of that material being cemented across the bottom to prevent the plate from falling off. This piece of apparatus should be selected with care, its greatest value arising from the fact, that its smooth plane surface when wetted enables us to bring the power of capillary attraction to our assistance for attaching the plate to it. This will not be the case if an uneven piece of glass is chosen.

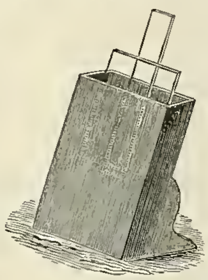


Fig. 5.

79. About double the quantity of solution necessary for filling the bath should be made, so that by pouring it back into the bottle, after use, it may be able to deposit any particles of collodion, dirt, &c., that may have got into it, and allow of a sufficient quantity being decanted off clear when wanted; this will be found in the end more economical than making barely sufficient to fill the bath, the loss by filtering (which would in that case be unavoidable) not being necessary; it is also of advantage, on the score of uniformity of action, as from its quantity it is not so liable to change as the smaller would be.

80. If the bath has a capacity of 16 ounces, 32 should be made; and if to this a supplementary bottle of solution is added, from which the loss by waste can be supplied, the operator may rely upon uniformity of action for months together. It will be found, that by keeping the larger bottle full (filling it from the smaller), that no addition of silver need be made to keep up the strength of the bath, the loss by conversion into iodide corresponding nearly with the quantity contained in the solution required for filling up.

81. After returning the solution into the bottle the bath should each time be well rinsed with water by half filling it, and then holding the dipper across its mouth so as to close it, shaking it well, repeating the operation two or three times.

82. Sometimes a more thorough cleaning is required, in which case a solution of cyanide of potassium will do it effectually, rinsing it of course afterwards with clean water.

83. It may be as well here to mention, that when the temperature of the operating room is below 60° Fah., the action of the bath is much improved by placing the bottle containing it before a fire, or into a basin of warm water, before using it; this remark applies equally to all the solutions, and to ensure *perfect working*, not only should the solutions be equally heated, but the temperature of the camera as well should be at the same degree, so that the temperature of the plate from first to last may not vary to any great extent.

84. When the collodion, as before mentioned, has slightly set, the coated glass is to be rested on the dipper, and immersed steadily without any pause, every check given to the movement producing lines which appear painfully distinct on every proof that it yields. The dipper, before placing the glass upon it, should be plunged into the bath for a moment to moisten it, for the reason before pointed out.

85. The proper time for the plate to remain in the bath cannot be stated with precision; it is necessary, as practised by most operators, to allow it to remain undisturbed for about a minute, it may then with advantage be lifted out from time to time to ascertain the state of the film. *When the oily-veined appearance, caused by the ether, gives place to a surface over which the solution flows freely and evenly*, the plate is ready for the camera. No harm is likely to be done by allowing an excess of time in this part of the process as the film is not injured by prolonged immersion when the bath has been prepared with the iodide as before recommended.

86. When the plate is removed from the bath, all excess of liquid should be drained from it, and after doing so it is advisable to wipe the uncoated side of the glass with a piece of clean linen rag, and also to place small pieces of bibulous paper at the corners of the plate frame before inserting the glass, for the purpose of absorbing any liquid that may still drain from it. When thus treated, the plates are much less likely to stain, and the camera can be kept drier and cleaner.

87. When silver corners are added to the frames the blotting paper need not be used, unless indeed we are anxious to keep the camera clean, in which case a piece may be laid along the lower edge of the plate after placing it.

88. In concluding this part of our subject, the reasons for the use of iodide of silver and alcohol in the bath may be given.

89. The iodide of silver is added for the purpose of saturating the bath with that substance, and, by doing so, preventing its attacking and partially redissolving the coating of the iodide formed on the plate, and so rendering the deposit unequal. If, however, the plate is kept so long out of the bath as to allow of the solution remaining on it being concentrated by evaporation, it will again acquire the power of dissolving the iodide, and if allowed to get entirely dry, the whole will disappear; we see, therefore, that the protection is only for the time the plate remains in the bath, and does not extend beyond, and that the sooner we use it after it is excited the greater is the probability of its working well.

90. The alcohol is added for the double purpose of making the plate more sensitive (which it does to a considerable extent), and of rendering the action of the bath quicker and more equal. The objection to its use is, that from the different amount of volatility of water and alcohol, the composition of the bath must be constantly subject to variation. The advantages to be derived from its use are, however, so great, that its want of steadiness must be disregarded, and by supplying the waste, by occasionally adding a little fresh, as much as possible remedied.

91. A practicable mode of keeping collodion in a sensitive state for a length of time has been long looked forward to as one of the greatest improvements to which the process is open. For this we are indebted to Mr. Shadbolt; and as his own description is so very clear it is subjoined *verbatim et literatim*:—

92. "Having prepared and excited the collodion in the usual manner, on its removal from the bath of nitrate of silver, it is to be drained pretty closely for about half a minute, and then immersed in a second bath, consisting of distilled water 20 to 30 oz. to 1 oz. of the exciting bath (the exact quantity is not of great moment), and allowed to remain in the latter mixture until the liquid flows evenly on lifting the plate up, which will happen in about from two to three minutes after immersion. The object of this proceeding is to wash away all but a slight trace of free nitrate of silver, as one of the causes of deterioration of the plate is the crystallization of this salt on the surface of the collodion. This distilled water bath should be in a vertical vessel similar to that used for exciting, and the same bath, if freed from impurities as they accumulate, will do for an indefinite time. To distinguish it, I shall term it the *washing bath.*

93. "The plate may be removed from this bath as soon as the liquid flows freely, and again drained closely, when a portion of the preservative syrup is to be poured on and off once or twice, being careful to avoid bubbles, or any minute particles of matter being left on the plate, which is then to be stood upright upon *clean* blotting-paper with the collodion side towards the wall, to drain. In about ten minutes' time, the lower edge of the plate where the syrup has become collected, may be touched lightly with fresh blotting-paper to remove the superfluity, and then placed in the dark frame, or stored away in a box for future use. It is not *necessary* to perform *this* operation until convenient.

94. "The preservative syrup is thus made:—Take of *pure honey* and *distilled water* equal parts by measure, mix thoroughly and filter. In my former directions a sixth part of the volume of alcohol was included, but further experience leads me to consider this unnecessary, if not detrimental.

95. "If thoroughly excluded from the action of light, plates thus prepared will keep good for a *very long time.* I have now two small stereoscopic negatives on plates that were excited on the 30th *November last* and not exposed in the camera until the 28th *December*, a space of exactly four weeks. They were not developed until twelve hours after exposure, which part of the process is conducted as follows:—The plate is to be again immersed in the washing bath and left from one to ten minutes to soak, occasionally lifting it up and down to facilitate the removal of the superfluous syrup and thoroughly to soften what remains upon the plate. The longer the latter has been kept, the longer it should be allowed to soak.

96. "When taken out, a sufficient quantity of the developing solution is to be poured over the plate in the ordinary way, and, *provided the plate has been properly soaked* in the washing bath, there is no great difficulty experienced in getting it to flow over, than when a fresh plate is used. The image should appear very slowly, and when all the details are out, *but very faint;* the developing solution is to be returned into the measure (*tak- especial care not to allow the small portion remaining on the plate to run in lines*), a feat readily performed if done quickly, and the plate instantly restored to a horizontal position. A small quantity of the *exciting bath* (a 30 grs. solution of nitrate of silver), from an eighth to a sixth of the volume of the solution that was poured from the plate into the measure, together with a like proportion of the preservative syrup, should now be added to the liquid in the measure and well mixed up; this is to be poured on the plate and kept moving until the picture is sufficiently intense, which can be carried to any degree if the exposure has been proportionably prolonged. So intense *can* the high lights be made that a whole day's exposure to *direct sunshine* will not print through them. Of course I only mention this to show what can be effected—not what is desirable.

97. "When sufficiently developed, the picture is washed and fixed as usual, either with hyposulphite of soda or cyanide of potassium as may be preferred.

98. "The developing solution I usually adopt consists of 1 grain to the ounce of water solution of pyrogallic acid, one-fourth of the menstrum being the ordinary acetic acid of the druggists, or, if *glacial* acetic acid is used, one-twelfth part is sufficient."

99. Dr. Mansell's remarks on this process are most valuable, and constitute an addition to it which will extend its application much beyond what Mr. Shadbolt originally anticipated; at all events, Dr. Mansell has, by his improved treatment of the plates before developing, rendered their keeping over extended periods a matter of much greater certainty than before. His remarks are in themselves a pointed instance of the bearing of slight differences of manipulation upon the success of any process which, like all photographic ones, is dependent upon a nice adjustment of a number of trifling and sometimes opposing influences. All that Dr. Mansell recommends as an improvement on Mr. Shadbolt's plan is to steam the plates before developing; his remarks, however, which are coupled with these recommendations are so good that no apology is offered for adding them at length.

100. "The plates were iodized as usual, immersed in one-grain nitrate of silver bath for a few seconds, drained, and coated with two doses of syrup. It is much better to be a little prodigal of syrup and make sure work with it, for if it is repeatedly used there is great risk in long excited plates of the reduction of some of the nitrate of silver it contains and consequent speckling of the negative. I (Dr. Mansell) got perfect negatives with plates kept up to 198 hours, but taking the average of eight experiments, I should say 150 hours is about the limit, after which there is more or less uncertainty. Beyond this time, owing to the hardening of the syrup and its almost total insolubility in the one-grain bath, the negatives were very defective, the image being extremely faint and obscured by a veil of indurated syrup, and the plate mottled over with black patches.

101. "The syrup, after it has been on the plate a short time, consists of two layers, an outer one which remains soft and hygrometric a long time and is soluble in cold water, and an inner film next the collodion, a compound of syrup and nitrate of silver which is insoluble in cold water This is easily proved by washing the plate in a vertical glass bath, when this layer is seen separating in bran-like scales, the water mechanically removing it. This inner layer, after about 150 hours, becomes adherent to the collodion at first round the margin of the plate, then to the whole surface, covering it as with a varnish, which no amount of washing in cold water will remove.

102. "Seeing, however, that plates kept long beyond the above periods were still sensitive, yielding images, although extremely imperfect, I felt satisfied that, could the indurated syrup be removed, perfect negatives might still be obtained. It occurred to me that steaming the plate would probably dissolve this indurated syrup, and after a few trials I met with perfect success.

103. "The following is the method I have pursued with plates which had been excited upwards of ten days before exposing in the camera (some having been kept 271 hours), although I am satisfied that the limit to the keeping of plates with this manipulation extends much beyond this period.

104. "On removing the plate from the dark slide, immerse it in the one-grain bath for five minutes, to remove the outer syrup, drain it, then hold it, collodion downwards, over the steam of boiling water poured into a flat pan for about ten minutes, taking care to keep the plate four or five inches from the surface of the water, the indurated syrup will gradually be seen to dissolve, and by inclining the plate the greater part is easily run off to any angle you choose. Having drained the plate, pour on pyrogallic acid (no image appears under this), after a minute or two, when the collodion has been well impregnated, pour off the pyro into a glass containing twenty-five minims of a ten-grain nitrate of silver solution (for an $8\frac{1}{2}$ by $6\frac{1}{2}$ plate), and immediately pour it over the plate, the image rapidly comes out and may be developed as usual to any extent With some kinds of collodion, or in very cold weather, it may be advisable before using the pyro, either to pour over the plate a weak solution of nitrate of silver, or to mix the nitrate of silver with the pyro in the first instance. I merely suggest this, having as yet found the method I have given quite sufficient.

105. "Steaming the plates cleans them so perfectly and gives such mastery over this method, that it is always better they should be so treated whenever there is the least fear that the syrup is indurated."

106. In this and the following operation it is scarcely possible to avoid staining the hands with the silver solutions. These stains may (if recent) be removed by first washing them over with a saturated solution of iodide of potassium, and then with nitric acid diluted, so as not to stain the hands yellow, that is to say, with twice its quantity of water. The iodide does not itself immediately remove the stains, but upon applying the nitric acid they soon disappear.

107. A more expeditious and effectual way is to rub the stains with a lump of cyanide of potassium wetted with water, and as soon as they begin to disappear apply tincture of iodine to them, which will remove them at once, then wash the hands well to

remove the cyanide. Care must be taken when using this salt on account of its extremely poisonous nature, and the injurious effects which follow upon its application to any part of the body from which the skin is removed. It must never be used if the hands are scratched or chapped, for in that case it will make its way into the flesh, a troublesome sore will be produced, and the loss of a nail may follow.

(*To be continued*).

THE CUTTING PATENT.

Richmond, June 1, 1856.

Dear Sir,—May has passed, and the patent men with all their scarecrow talk have been afraid to bring their worthless, contemptible patent case to trial. You will remember I stated in my last that it was to come off in May. As I had received a summons to that effect I fully expected that it would, and was well prepared for it. But I suppose they have consulted wiser heads on the subject, who quite likely informed them that no judge or jury could be found ignorant enough to decide in favor of a patent which has been so stupidly issued as this, right in the face of facts published years anterior. The book which I referred to, in my last letter to your Journal, has furnished Cutting with nearly all his *patent ideas.* In it may be found highly recommended bromide of Iodine for collodion, and also balsam of fir for sealing daguerreotypes. The author using nearly the same language to describe its application and beneficial effects upon the daguerreotype, as Cutting has since adopted to describe its wonderful preservative qualities upon the ambrotype. Quite a singular coincidence. Is it at all likely that Cutting, with his keen Yankee eye, always on the look-out for something to patent, and sell to "*respectable operators*," should have overlooked this article on sealing daguerreotypes with balsam, when it was published in the same book from which he got his *original and patented idea* of the use of bromide of iodine for collodion? But whether he did or did not overlook it, the fact alone of its being published is sufficient to vitiate this bug-bear balsam patent. I hope the day is not far distant when the patent laws will be so revised that a person cannot obtain a patent for that which belongs to another; or which is even worse, as in this instance, the public at large, without the risk of being heavily fined for the theft. Daily something turns up to show the necessity for some such change as this in our patent laws. Until this, our art must suffer from many such annoyances as the Balsam Patent.

Yours very truly, M. P. Simons.

Making an Old Master.—"My dear fellow, whenever my pockets are empty, and I want a ten-pound note to put into them, I make an Old Master." I stared hard at him, not at first quite understanding what he meant. "The Old Master I can make best," continued Dick, "is Claude Lorraine, whom you may have heard of occasionally as a famous painter of classical landscapes. I don't exactly know (he has been dead so long) how many pictures he turned out, from first to last; but we will say, for the sake of argument, five hundred. Not five of these are offered for sale, perhaps, in the course of five years Enlightened collectors of old pictures pour into the market by fifties, while specimens of Claude, or of any other Old Master you like to mention, only dribble in by ones or twos. Under these circumstances, what is to be done? Are unoffending owners of galleries to be subjected to disappointment? Or are the works of Claude and the other fellows, to be benevolently increased in number, to supply the wants of patrons to taste and quality? No man of humanity but must lean to the latter alternative. The collectors, observe, don't know anything about it—they buy Claude (to take an instance from my own practice) as they buy all the other Old Masters, because of his reputation, not because of the pleasure they get from his works. Give them a picture with a good large ruin, fancy trees, prancing nympths, and a watery sky; dirty it down dexteriously to the right pitch; put it in an old frame; call it a Claude; and the sphere of the Old Master is enlarged, the collector is delighted, the picture-dealer is enriched, and the neglected modern artist claps for joyful hand on the well-filled pocket. Some men have a knack at making Rembrandts; others have a turn for Raphæls, Titians, Cuyps, Watteaus, and the rest of them. Anyhow we are all made happy—all pleased with each other—all benefited alike. Kindness is propagated and money is dispersed."—*Household Words.*

THE PHOTO-GALVANOGRAPHIC PROCESS OF ENGRAVING.

In the hands of Mr. Paul Pretsch, lately the manager of the Imperial Austrian Printing Office at Vienna—the productions of which workshop were so greatly admired in our Exhibition of 1851—light and electricity have at last been most effectively combined, and trained to perform the united functions of the artist, draftsman, and engraver. Drawing by light, and engraving by electricity, are, in themselves, far from new. Every town now possesses its photographers, who enjoy the means of indelibly reproducing not only the outlines, but the nicest lights and shades of both natural and artificial objects, quite independently of the exercise of any purely artistic genius. Similarly, the substantially reproductive power of the electrotypic art, for the purposes of the printer, is a fact of old standing. But the production of printing plates capable of giving us every touch of nature, without necessitating the employment either of the pencil of the artist, or the burin of the engraver, is something far advanced beyond even these ingenious scientific applications.

Mr. Paul Pretsch—engaged, as he has been, in the pursuit of science, and improvements in the fine arts, and developing them for the purposes of the printer's multiplying power, under the auspices of a government which, in this instance, at least, has shown a highly enlightened spirit—was very early impressed with a deep sense of the power conferred upon man by the introduction of photography, and saw clearly enough how much this art was able to assist the real artist in the creations of his own mind, and in multiplying his works. During his photographic trials, he made several experiments upon etching upon metal and stone; but, in adering to the practice of his predecessors, he got involved in the inconveniences due to the necessity of etching several times for the production of different tints. It was whilst these gropings towards improvement were going on, simultaneously with investigations into photography, that the idea arose as to the possibility of producing, photographically, a printing surface of *relievo* and *intaglio* parts, instead of a mere picture made up of lights and shades. This led to the abandoning of etching or biting in with acid, and the substitution of a new photographic coating adapted for finally obtaining impression surfaces. The results of Mr. Pretsch's labors, as far as they have yet advanced, are now before us. They consist of a set of impressions from plates produced entirely by what the inventor calls "galvanography," the largest size we have seen being 16 inches by 12 inches. The subjects are various, including both architecture and the figure; and, as examples of plates made ready for the printer's hands, without a single touch of the graver, they are far beyond mere curiosities; indeed, they may fairly be classed with good calotypes, or well-finished sepia or indian-ink pictures of the artist, and in beautifully minute accuracy, far outrivaling all that can be produced by the unaided hand of man.

The primary steps of this photo-galvanographic process are similar to those adapted to the glass-plate photographer. The operator coats a glass plate with a gelatinous solution, suitably prepared with chemical ingredients sensitive to light. This gelatinous matter consists of clear glue, with a strong solution of nitrate of silver, and a weak solution of iodide of potassium. To another portion of the glue solution, there is added a strong solution of bichromate of potass. These two compounds mixed together, form the coating material, which is allowed to dry upon the glass or other plate which is coated with it. When dry, the coated plate is exposed to the light in a copying frame, in contact with the print or drawing which is to be copied; or the camera may be used for a similar purpose. After exposure, the plate exhibits a faint picture on the smooth surface of the sensitive coating, and it is washed either with water or a solution of

borax, or carbonate of soda, when the whole image comes out in relief, whilst the tints of the origiual are stlll maintained. When sufficiently developed, this relievo plate is washed with spirits of wine, dried, and treated with copal varnish diluted with oil of turpentine. When dry, the plate is immersed in an astriugent solution—as tannin, for example. This treatment, aided by heat, brings out the picture in full relief, ready for beiug copied for the productiou of the actual printing plate. If the matrix plate is prepared for electric conduction, it may itself be placed in the electrotype battery, producing an intaglio copper plate; or, if first moulded, the intaglio mould furnishes the means of obtaiuing a relievo plate by electro-deposition in a similar way. The stereotype process also affords another means of producing the necessary plate. If an intaglio plate is made, it may be printed from at the common copper-plate printing press; en the other hand, the relievo plate may either serve as the matrix for producing an intaglio printing plate, or it may be itself employed in surface printing, like a wood-cut. In the latter case, the narrow impressiou lines being sufficiently raised, the broad white spaces must be cut out.

By another modification of the process, the gelatinous eoating of the image plate is washed with spirits of wine, and then dried, when the picture is produced in intaglio, or suuk. Or, by applying printiug ink to the coatiug, an ink impression may be taken for transference to stone or zinc, to print from in the usual way.

The examples of Mr. Pretsch's produetions, to which we have referred, are quite sufficient to show us that the delicate beauty of original photographs need no longer be restricted to the aetual picture which the camera gives us; nor need we be driven to the slow process of eopying by negative pictures for the productiou of what are, at the best, but inferior counterparts of the original. The beautiful art of the photographer is thus rendered far more practically aud enduringly valuable than it has hitherto been.

The impressions from the photo-galvanographic plates exhibit a tint mueh superior to mezzotints or aquatiuts, whilst whatever touches appear in uature are reproduced at the printing press with a fidelity whieh no artistic labor can rival. We know, too, how very liable photographic origiuals are to change; and in a series of copies from the same negative, there is always a want of uniformity in the shade of eolor. With this printing proeess, however, we are independent of such drawbacks, as the plate impressions are in ink, and the attention of an ordinary printer suffices to keep the pictures to the proper color.

The rapidity with which the plates can be produced is another important and remarkable feature of the invention. From three days to three weeks, according to the special kind of work in hand, is time enough for the production of finished plates, some of which—as, for example, those from photographie origiuals—the human hand could never engrave; or if imitated by mannal engraving, would require even years of unremitting labor. The proeess, too, affords the means of obtaining exact eounterpart plates, so that where extreme expedition is au object, several printing presses may be at work simultaneously, all producing exaetly similar impressions. In all cases the artist's original designs are reproduced without the aleration of a siugle line or touch, and on any scale, so that the cartoons of Raphael, at Hampton Court could all be quickly put on printing plates of a size suitable for a pocket volume.

An influential company has been formed in this eountry for carrying out the objeets of the invention on a large commercial scale.

From Notes & Queries.

M. DE CARANZA'S WAXED PAPER PROCESS.

The following aceount of the process employed by him has been presented to the Sociètè Franeaise de Photographie by M de Caranza:

"The paper which most photographers rejeet is precisely that which I employ in preferenee. All my negatives are obtained with paper very much pressed, and piereed through with an infinite nnmber of small holes. These papers appear to me to retain more wax than those of a more compact texture, where the wax cannot so easily lodge and rest on the surface. The *papier pelure* in which I find all the qualities which I have just mentioned, has furnished me with pictures which are second to nothing in delieacy to collodion aud albumen, without having their dryness. I commence, then, by choosing those sheets which have an even grain and thickness, and which contain no metallic dust. After having cut them large enough to extend three or four centimetres on each side beyond the plate of my frame, I submit them to the operation of waxing.

"I have obtained good results with both white and yellow wax; I prefer, however, the white. I melt it in a very clean vessel, which is used entirely for this purpose. As soon as it is melted it should be strained through muslin to get rid of the impurities which it may contain, placed again on the fire; then as it is ou the point of evaporating by the heat, by the aid of a large brush called *queue-de-morue*, I cover a sheet of paper on both sides. If I have a certain number of sheets to prepare, sixty for example, I cover ten sheets with wax ou both sides, and these serve to wax the fifty others.

"These ten sheets being waxed on both sides, I place five sheets of unwaxed paper on a porfolio of blotting paper, covered with a sheet of ordinary paper, then that waxed on both sides, aud lastly five others not waxed. I cover all with a large sheet of ordinary paper, rather stronger, and I pass over it a moderately hot iron until the heat has melted the wax, and the two first sheets ou both sides of the waxed sheet have imbibed the wax; I change the sheets, and I obtain them equally well waxed.

"The absorption of the superfluous wax, which many photographers perform with blotting-paper, is tedious and defective; in many sheets the wax is found to be too completely removed or they retain on the surface some of the fibres of the blotting-paper. These sheets ought to be rejected, as, in the first place, the proofs are granulated, and in the second they are stained.

"For the purpose, then, of *unwaxing* my seleeted negative paper, I place alternately on a cushion of blotting-paper an unwaxed and a waxed sheet, to the number of about forty. Then, with a moderately hot iron, I make the excess of wax pass to the new sheets. One operation will ordinarily suffice, and by this process in half a day I can easily prepare a hundred sheets of paper.

"*To Iodize the Paper.*—In 1000 grammes of distilled water I put three grammes of starch, aud boil it till it is perfectly dissolved. Having taken it off the fire I add.

Sugar of milk........................	40 grammes
Iodide of potassium..................	15 do.
Cyanide of potassium................	0-8 do

This solution is that iudieated by M. G. Legray; I have omitted the fiuoride of potassium, which, without addiug to the sensitiveness of the paper, makes it granulated. Whilst this solution is still tepid, I strain it and pour it into a porcelain or gutta purcha dish, and introduce one by one a dozen sheets of wax paper, taking care to let the liquid run all over them, and with a badger brush I remove the bubbles of air which would otherwise adhere to the sheet.

"The paper ought to remain thus for about half an hour, but it is necessary to agitate the dish frequently, in order that the eombination of the wax and the salts should be as complete as possible; after this the sheets should be taken out one by oue, and hung up to dry.

"Care must be taken not to put the waxed sheets iuto the solution without first making it tepid; I insist on this point, because in a hot atmosphere, if the paper has not been treated in this manner, the wax reappears again in about fifteen or twenty days, and the sensitizing becomes difficult. The dry sheets ought to be very white and of a very granulated appearauce. It should be remembered that in order to obtain good pictnres, iodized paper shonld not be kept more than a month; after that time the iodizing should be renewed. It would be better not to use the iodizing solution more than onee or twice; beauty of the pictures, depending on the reeent preparation of this solution.

"*Sensitizing the paper.*—The following solution is to be prepared in a blue or black bottle;

Distilled water	500 grammes.
Nitrate of silver	35 do.
Crystallisable acetic acid	40 do.

This may be used an hour after it has been made. The sensitizing the paper should be done in a dark room, or by the light of a candle.

"Filter this solution into a porcelain dish larger than the paper, and plunge a sheet of paper into it, taking care to agitate the dish continually. After four minutes of immersion the sheet becomes of a milky color, and resembles opal glass. It should then be taken out of the acetonitrate and immersed in a dish of rain water, or what is better, distilled water. Another sheet is then placed in the acetonitrate, and the first sheet strongly agitated in the water, and placed in another dish of distilled water. After taking the second sheet out of the aceto-nitrate, the first is removed from the water, passed between two sheets of blotting-paper, and placed upon the plate of the frame; the plate is then put into the frame, the edge of the paper being folded back so as to stretch it as much as possible. In a few seconds the paper has become very much stretched, and the surface very even. This method insures a high degree of finish, and prevents the paper contracting by the heat.

"The paper thus prepared and placed in the frame can be kept for three days at least even in hot weather. I have obtained very beautiful pictures with paper that has been prepared fifteen days, and with a constant heat of from 86 to 95 degrees of Fahrenheat.

"The solution of acetonitrate having been returned to the bottle, it is necessary to add ten grammes of animal charcoal; shake the bottle well, and allow it to rest until it is required again.

"With a single lens of seven centimetres diameter, thirty-five centimetres of focal length, and a diaphram of fifteen millimetres, I have obtained negatives in four minutes, under the conditions of the light in the east.

"I develope with a solution of gallic acid, prepared immediately before using. I filter it, and add a few drops of fresh acetonitrate. As soon as the picture has appeared I wash the paper, and then plunge it into a solution of hyposulphite of soda, of the following strength:

Hyposulphite of soda	100 grammes
Rain water	600 do.

Half an hour's immersion is sufficient: the picture is then taken out and left for twelve hours at least in hot water, which should be frequently changed."

Personal & Art Intelligence.

— In our January number we stated that we had seen a specimen of a new style of photographic portrait which would, in our opinion, take precedence of all others in the public estimation. We now have the pleasure to announce that this unique and splendid art will be shortly presented to the public. We learn that Prof. John Bishop Hall, the inventor, has entered into a co-partnership arrangement with Mr. J. Gurney, the world renowned daguerreotypist of this city, for the purpose of introducing the invention in this country and in foreign states. This announcement will satisfy all photographers of the importance of this discovery, as Mr. Gurney's character and reputation stands too high with the public to be jeopardized by connection with anything of an inferior caste. This process being superior to that of Daguerre for portraiture, and altogether different from any known as practised by any other chemist or artist either here or in Europe, and as we deem it but proper that any invention of intrinsic value—especially one of so brilliant a nature as this—should perpetuate the name of its originator; we, having been called upon to give it a name, think none can be more appropriate than the

Hallotype. The persevering energy with which Mr. Hall has pursued his studies in this art, and the success at which he has arrived in producing a really beautiful picture, is deserving of the highest praise. The mind can, while looking upon one of them, almost be made to believe that it is looking upon the individual in *proprie personæ*, compressed into a smaller compass; possessing all the attributes of the more enlarged form, and only requiring the gift of speech to make it perfect. No photograph of the face could, taken naturally in colors, give greater pleasure to the mind than these of Prof. Bishop Hall. Life, expression, beautiful effect, and all that can charm the mind, and heart, and please the taste are there. Natural defects are softened, while the beauties show forth in all their brilliancy. Yet so subdued is the coloring, so life-like the general expression of the face, and the contour of the body, that nothing gaudy or offensive meets the eye. To all appearance, nature herself in miniature form stands before you, as it were, losing none of her attributes in the reduction; in every way they are pleasing to our eye. Possessing none of that harshness of outline peculiar to other photographs, particularly the *ambrotype*, the beautiful gradations of light and shade, exquisitely softened by the truly flesh-like tints, as transparent—even more so—as those of the finest miniature on ivory, their value is heightened by the truthfulness of expression given to the face. So rapidly is the work executed in the camera, that he would be but a very indifferent artist who could not catch the best and most happy expression of the sitter, and avoid the rigid expression which ruins nine-tenths of the photographic portraits now taken. We had the pleasure of giving Mr. Gurney three sittings, on which occasion he took three perfect pictures in an incredible short space of time—one a full face, the second a three-quarter, and the third a profile. Neither was a failure in any respect. Subsequently they were shown to our wife who pronounced them the only good and life-like portraits ever taken of us. The first portrait by this process we ever saw, was executed by Mr. Hall himself, and not only did we express to him our sanguine expectation that these pictures would supercede all other styles for portraiture, but others to whom they were shown, considered them the most beautiful of Helia's handiwork. As to their durability there can be no doubt. Mr. Gurney, after a thorough course of instruction in the art, assures us that he will stake his reputation, that they will last for ages.

These exquisite productions of art will be on exhibition at Mr. Gurney's gallery on and after the 26th of the present month, when those who have expressed to us their scepticism, upon our description of them, we feel assured, will acknowledge the justness of our remarks. We probably shall be prepared to state in our next, what disposition will be made of this discovery among the photographic artists. That it will be judicious we have no doubt; but as Prof. Hall has been at great expense and trouble in prosecuting his chemical experiments, we trust he will be amply remunerated, and we have no doubt that photographers will take pleasure in liberally rewarding him for presenting to them an art so perfect and exquisitely beautiful, and which may never be excelled.

— S. J. Scott.—The *Ambrotype* is nothing more nor less than positives on a collodion film spread upon glass, and backed up by any black substance, such as cloth, paper or varnish. The patent, in our estimation, is all "*bosh*"—not worth a straw—in fact we have recently learned that Mr. Cutting has surrendered it, and is endeavoring to procure a new patent covering a greater field of operation; but we have no hesitation in saying that any patent that may be granted him for his present specifications can never be sustained. The best work we have yet seen on this branch of the art, is published by N. G. Burgess, and can be obtained at the office of the Photographic and Fine Art Journal, or of any of the dealers in photographic material in the United States.

— M. N. Faris.—Your promised communication will be highly acceptable. Your suggestions we will endeavor to have carried out.

— Thos. J. Bailey.—We assure you that the "Western small fry" are fast over-reaching the Eastern big fish. The specimen of your work sent possesses certain excellencies not often found in our most celebrated galleries. The disposition of light and shade is admirable, the position most artistic, and the figure of that roundness and prominence, which characterizes the skilful artist. The drapery is very good and well developed, while the eye possesses that clearness of expression too often destroyed in photographs by bad position. We wish some who make greater pretensions would take lessons of such " small fry" as this picture indicates. They could learn something.

— Mr. Snelling:—I am very glad to see that there is some interest being taken by the contributors to your "Journal," in regard to Mr. Cutting and his "patent rights." I think that this matter should be settled, and that it cannot be done too soon. I am with Messrs. Webster & Bro.,—willing to pay my portion, in the expenses of a suit. In regard to using *Alcohol*, in preparing gun-cotton, I have this to say:—While in Luck & Landers drug store a few weeks since, the conversation turned on this subject, and Mr. Luck (who is a practical chemist), informed me that he had used " alcohol for expelling acid from gun-cotton," at Cincinnati, Ohio, *four years ago*. Since that I have been using the alcohol, for the above purpose, and would recommend others to do the same.

I have a fine opportunity to take views out here, and hope soon to be able to put a few up that will do to send you.

Vincennes, Ind. Respectfully, J. D. R.

We don't think this question will ever be tested. Mr. Cutting has too much sense to attempt its enforcement. He has used several cat's paws to extract the hot chesnuts from the fire of public opinion, and as *they* have been somewhat burned, he will hardly trust his own in the same furnace. We shall be pleased to receive the negatives.

— S. M. Ely.—We have again forwarded you another copy, and trust it may succeed in reaching you, and in escaping the pilfering fingers on the way.

— E. M. Van Aken.—In our opinon, *blue glas* is superior to *white*—so-called—for sky-lights. It is a well ascertained fact that light passing through a blue medium is decomposed, and while the yellow, red, and other rays, which retard photogenic—or actinic—action in the camera, are driven off, white light which accelerates it, and is in fact the actinic power, alone is admitted into the operating-room. This advantage is not thought by operators sufficient to counterbalance the extra expense of *blue* glass over *white*—the former being about thirty-eight cents the square foot, while the latter is but ten.

— It is not our desire to bring our private affairs before the photographic community, but in the case of the publication of Mr. Root's book *on Ambrotyping*, the matter is not wholly our own; those who have taken our announcement in good faith and acted upon it are entitled to consideration, and should know the why and wherefore of our not fulfilling our engagement. It is with this view, and this only, that we publish the following communication from Mr. Root, and append our comments to the same We shall give his communication *verbatim*, and answer it by sections, and hope we shall be able to substantiate our remarks by his own previous letters.

To the Editor of the Photographic and Fine Art Journal.

Sir:—I have this day read in your May No., the allusion made to my forthcoming book on Heliography, in which you apprise those of your readers, who have sent you money, that "there is, or appears to be, no probability of its *ever* being published." You may now add, "by yourself." You may also add, " or sold" (as advertised by you without my permission), " at 50 cents per copy.'

Had I seen the advertisement before publication, it would never, with my consent, have appeared in the shape you saw fit to give it.(1)

Your desire appeared to be, to have me throw *hastily out*, what must inevitably have been an inefficient little treatise, without paying much regard to its merits, as an "Instructor," or to my own reputation, as its author,—a work, which should merely serve to forestal other petty works on the sam subject, and bring, perhaps some pecuniary profit to yourself.(2)

It was at one time, my purpose to entrust to you the publication of that portion of my forthcoming work, comprising the " Positive process,"—commonly called in this country the " Ambrotype,"—in a separate form. But, on mature consideration, I ascertained two things; first, that within the short time specified by you, I could not prepare a treatise sufficiently thorough, clear in arrangement, minute in detail, and authenticated by consultation of the best documents, together with careful experimentation, either to satisfy my own feelings, as to what such a work *should* be, or my conviction as to what was needed by professors or amateurs, in the Heliographic Art, and sending to you the manuscript in loose sheets as they were. Secondly, that preparing it in this hurried manner written, I could not make it correspond, in style and general treatment, with the residue of the larger work, of which it was to constitute a part. I should, then, have been obliged wholly to recompose it for that work, (had I sent the manuscript, as you urged me to do, to be stereotyped there in your office); a task, for which I could spare neither the time nor the labor requisite. [Why did you then deceive us by false promises, as will be shown by your letters?—Ed].

I have, therefore, prepared the chapter on the " Positive Process" with the same care and unhasting deliberation, which I have given to the whole book, and have had it *stereotyped* in this city, under my personal supervision, as I had an unquestionable right to do.(3)

With this last step you found fault, and *hastily* said, that you " declined having anything further to do with it." I, on my part, at once resolved, that you *should* not, unless on equal terms with others; and subsequently wrote you, that if you wished, you "might sell the work, when published, on commission." I now will add, that my terms, with you, will depend upon the course you pursue in regard to me and my work.(4)

In your last No. I notice, that you have altered the wording of your advertisement. Let me remark, that the substitution of a "*few weeks*," for a "few days," would be more honest to the profession, as well as to the public at large.(5)

As another reason, why I am " making haste slowly," it may be said that a *new* and very striking phrase of the Heliographic Art, is about to be made public, and as its discoverers desire in my treatise, to make such announcement of it, as may suffice to prepare the community for its reception, and Heliographers for its introduction, it is necessary for me to wait until all is prepared, and such announcement got ready for publication.(6)

You say, " Mr. Root has pursued a course in regard to it, that is, to say the least, very reprehensible, having forfeited his word with us, and placed us in a position not very agreeable." Do not forget, sir, that this disagreeable position, is of your own choosing.(7)

For the rest, I took you at your word, and shall assuredly do with my own, what my deliberate judgment dictates. My book, Providence permitting, *will be* published. More than 300 pages are already stereotyped, and the manuscript for the remainder is nearly completed, waiting only for illustrations to be engraved. It has cost me much time, research and labor; it covers the total field of the Art; besides, I may add, that having been kindly favored by the Chief Examiner at the Patent Office with many important facts relating to the Art; it may, to use his own language, be hereafter used as a Book of *Reference* by the department. At all events, it will, I trust, be acceptable to the public generally, as well as to the profession. Over 1,000 copies are already engaged at a price satisfactory to myself, and that, too, without advertising.(8)

This information may, or may not be of interest to your numerous readers.

You may find in your Journal, contributed during the last three years, several articles over my name, and some few which are anonymous.

I have others, ready written, the art is daily acquiring fresh interest; the field is a fruitful one; and I may, perhaps, occasionally contribute " more of the same sort."

While, last week in Washington, I obtained several interesting facts connected with Patents, and the History of Heliography, which will probably be laid before the profession at some future day.

This explanation, Mr. Editor, will serve, I trust, to set me right with yourself in regard to my delay; while its publication should certainly set *you* right with the public; especially "those of your readers who have sent to you money," for said book.

Respectfully yours, &c.,

Philadelphia, June 5th., 1856. M. A. Root.

If this is not adding insult to injury, we do not know the meaning of the term. The facts of the case are these. Early in January last, we met Mr. Root and proposed to him—with the previous knowledge of his being engaged on a work on photography—to write a book for us, *devoted exclusively to the Ambrotype*,—to contain 60 printed pages and to be sold at 50 cents. We urged an immediate answer, giving as our reason, that we wished to advertise it in the forthcoming number. Mr. Root consented to do this for a certain portion of the profits, and the advertisement appeared. Can any one, for a moment, give him credit for truth when he pretends to ignorance of the purport of an advertisement in which he was interested, which had been published three months? That the nature of our proposition was, as we have stated it, may be inferred from the following letters received from Mr. Root after his return to Philadelphia:—

Philadelphia, Jan. 24th, '56.

H. H. Snelling, Esq.:

Dear Sir,—I have delayed as long as possible, and have my reply to your proposition reach you to-morrow (Saturday as promised), so that I might know the result of the patent investigation at Washington, and communicate the same to you in this letter. But my friend has not returned. He requested a gentleman from this city, to say to me on his return, "that all was fixed, as I desired, and in time." We will furnish the Journal, with the whole matter, soon after he returns. Now, friend Snelling, after examining the Ambrotype subject, or considering your proposition, I am of the opinion it would be best for me to close up my book, bring it to an end, with the Ambrotype and Photographic processes as we now practise them, and publish the work at once, or in a few weeks. I think it might be completed in a month, as 260 pages are now ready stereotyped, and most of the manuscript for the balance is ready for the compositors. I could, by close application, finish my matter in a few nights (I do my writing while others sleep).

Would it not be best to give my whole book at once, not in parts? such is my opinion. Could you not take some interest in it, and *advertise*, and sell the work for a *per centage* or on commission—which would answer your purpose quite as well as to publish a small book on ambrotyping.

If such a book were to be advertised extensively, it would take the *wind* out of ——— sail—think of it and write me.

Yours, &c.,

M. A. Root.

To this proposition we demurred, on the ground that it would take too long a time to finish, for the purpose intended, namely, to meet the wants of the daguerreotype community, who were seeking information on the particular subject of ambrotyping; and also because others might forestall the market, and by that means suffer the book to fall a dead weight upon our hands, and we did not wish to run such a risk. Here is Mr. Root's answer to our demurr:

Philadelphia, January 30th, '56.

Friend Snelling:—Contrary to the advice of some of my friends here, and without consulting my partner, Cook, I have concluded to accept of your proposition, and try to write up the "little work," or guide to new beginners in the ambrotyping process. You must give me all of the time possible, to enable me to make the book as full and complete as I can.

If I furnish the manuscript in the course of the next week, you must be satisfied. I have to write evenings after a very tiresome day's labor, and have at the same time much other writing to do daily.

I would also state, that I must use the same matter, for my book, with alterations, &c., *before you publish it* in the *Journal.*

Yours, &c.,

M. A. Root.

And here is another on the same subject:

Philadelphia, Feb. 1st., 1856.

Mr. Snelling—

Dear Sir:—I am engaged with the little work, on Ambrotyping. It may take a few days longer to finish it than you supposed, as I would not send out anything hastily.

If you have any *matters* or *facts* upon this subject "Positives on Glass" please send it over, and oblige,

Yours, &c.,

M. A. Root.

The MS. not being forthcoming according to promise, we again wrote to Mr. Root and received the following reply:

Philadelphia, February 11th, 1856.

H. H. Snelling, Esq.:

Dear Sir,—Your note came to hand in due time, and I then expected to have seen you this morning. Circumstances have delayed my leaving home for a day or two yet.

As I find the *little book* requires more *time* and *attention* than I expected when I saw you, to make it what it should be,—both for your sake and for my reputation, and the good of that portion of our *craft* who may look for a "real help in time of trouble," I cannot allow it to be stereotyped until I have *carefully tested* every formula given for *collodion positives*, &c., &c.

I have given the "History of Collodion" as complete as possible from the facts in hand, and the fullest manipulatory instructions upon the production of "Positives upon Glass."

In order to do this, I must go over the whole range of the collodion process, except the printing of photographs.

Then I must have time to make it such a book as my judgment will approve of, let it require more or less.

Enclosed is an article for your Journal (unless I send it by Mr. Marshall in the morning).

Yours, &c.,

M. A. Root.

In order that there should be no unnecessary delay, we answered this by requesting him to send the MS. of what he had written, that we might be putting it in type while he was writing the last parts. The following was his reply:

Philadelphia, Feb'y 15th, 1856.

H. H. Snelling, Esq. :

Dear Sir,—Yours is at hand. I cannot well comply with your wishes to send over my work in parts or sheets, as it is frequently necessary to refer back to Chapters, paragraphs, &c. The task is more difficult than I at first apprehended.

My determination is, however, to make as good a book as is possible under the circumstances; and I regret now that I gave you a promise to furnish the manuscript for immediate publication.

——— book is out, and unless I can get out a much better, I cannot expect to receive much credit for it; therefore I must now take my time, if it should require three months, to finish it. Even if *others* should follow ———, I shall take my time and "make haste slowly."

Mr. Marshall left this morning for New York, and I expect to be in New York next week. I send by mail the article mentioned in my last note. Business dull—all frozen up.

Yours, &c.,

M. A. Root.

These letters, we think, settles the matter so far as the publication of the work is concerned.

(2.) As far as the assertions in this paragraph are concerned,

no one knows better their untruth than Mr. Root. We did wish to publish it in advance of any other that might appear, in order that their publications should not deprive us of the fruits of our enterprise; but had our desire been to put forth an inferior work, we should not have applied to a man so capable of doing it justice as Mr. Root. We could have got other MS. on easier terms than those offered him. To our remonstrance against the long delay in sending the MS., we received the following reply:

Philadelphia, March 21st, '56.

H. H. Snelling, Esq.:

Dear Sir,—Your note of last week reached me, and as I expected to be in New York some day this week I intended to have seen you and settled our matter. But after finishing my business, it was *too late* to call upon you and reach the boat, as I was obliged to do, to reach home when business required.

My book is drawing to a close, and I will be ready for the public in due season.

I suppose it will be *fitted* to *meet* the *requirements* of the *times*. *You* may understand me. The *promise to the public in your advertisement* can be explained at a proper period. I shall address to you a *letter* which will be written for the public eye, in which a satisfactory explanation I trust will be given.

The delay will result to *our mutual* interest, I am confident.

As to another article on "Patents" I will say, if there should be any demand for "more light" it shall be forthcoming. It may be in my power to throw more influence into your Journal in the course of a few months than you dream of,—for the present the word is "mum."

Yours, &c.,

M. A. Root.

[Mark! in his "apology" he expresses ignorance of the contents of that advertisement.—Ed.]

(3.) How true these last three paragraphs are may be inferred from the following letter:

Philadelphia, April 1st, '56.

Mr. Snelling:

Dear Sir,—Herewith I send to you a little "outline of the history of daguerreotyping" in this city. It was intended to follow a short article or letter from Prof. Morse, which was published in your Journal last year (the No. I have forgotten, and the Journals are not at hand).

This *history* will be continued down to the present time, and other chapters probably sent to you for the Journal.

I have *several* on hand ready for publication.

The "*apology*" for delaying the promised book on Ambrotyping I will send over in a few days, or hand it to you myself. *Hall* is an old friend of mine. My delay will be for the best in the end, and the *matter* of the book so very appropriate to the *times* and *circumstances*, as to create a general demand for the *little* work. Will you send to me *fifty sheets* of the very best,—the finest positive paper, you can get in New York at this time, and when your "sax paper" arrives, send over 100 sheets *immediately*, and oblige, &c.

Try to send by express *to-morrow* the 2d of April. We are suffering for something to do with the photograph.

Yours, &c.,

M. A. Root.

In answer to this, we wrote again urging no delay, informing him of the receipt of orders for the book, and the impatience of those orders; to which we received the following:

Philadelphia, April 5th, '56.

H. H. Snelling, Esq.:

Dear Sir,—The common paper came to hand—many thanks for *even* the "common." Now please send 100 sheets of Sax, the very *hour* you receive it through the custom house.

Also send by express four bottles Anthony's *best* "Negative *Varnish*" as soon as you have received this order.

I hope to see you next week. All goes on well: let the orders come. When will your April number go to press—*answer*? I wish to give you an *apology* for *insertion* in that number, for my *delay* of the book, and other matters *relating thereto*.

The plan of my book has been somewhat changed to coincide with *coming events*. The public will find it all in "good time."

Yours, &c.,

M. A. Root.

(4.) This letter was the first intimation of a change in his plans and designs. Shortly after he visited New York, and quietly informed us that he was having the work put in type and stereotyped in Philadelphia. To this we objected, as subjecting us to extra expense, as the same work could be done in our own office at half the cost to us; and that as we were unwilling to pay this additional expense, we must decline having anything to do with it. To this he replied, that as he wished to use the plates in his forthcoming work on Photography, he had had them stereotyped in the same style and of the same size, and that he could send them on to us for the purpose of printing a sufficient number of copies to meet the demand for the advertised work, after which they could be returned to him. To this proposition we acceeded, and he left us. The threats conveyed in this paragraph, and throughout this whole article, as well as the more vicious one in the private letter accompanying it, are indeed worthy of the man.

(5.) Had we not *been promised* an "*apology*" for the *April number*, and the "matter being made right between us," our *honest* convictions would have led us to discontinue the advertisement altogether from and after that time.

(6.) The value of this assertion is made aparent by perusing the letters above given. Our proposition was made to him in good faith, and so advertised to the public. Where the fault lies the public are abundantly able to judge, and "out of his own mouth we think he stands convicted." We again say that he has pursued a course very reprehensible. Was it not so, to deceive us with promises he never intended to fulfill? Was it honest to repeatedly assure us that he would send or bring the MS. in a few days—which the published letters abundantly prove—while at the same time he was actually stereotyping the work in Philadelphia, and advertising it by circulars, independently of us, to whom he had engaged it?

(7.) From the conversation we held with this man on a recent visit, and his allusion in one of his letters, and also from a letter addressed to Mr. Hall, we are led to believe that in this paragraph he has reference to the invention of the latter gentleman. Mr. Hall desires us to say that so far from wishing anything of the kind as indicated, he positively declined having it even mentioned in Mr. Root's book, until after its introduction to the public, and so far as he is concerned, the paragraph is untrue.

(8.) We give Mr. Root the benefit of this cunning device to *further advertise* his work at *our expense*, for we believe he is fully capable of producing an excellent treatise on Photography, and we should desire to see it sell well, but this cannot alter our *appreciation* of the *man*.

To the residue of his "*Apology*" we have but one word to say. We duly appreciate the articles he has contributed to the Journal, and we are only sorry that our *first business* transaction with him should have terminated in such a manner as to oblige us to decline *all future intercourse* with him. His "*Apology*" shows us that he is incapable of meteing out any other kind of justice than such as the "wolf gives to the lamb." We have no doubt *he* has "set us right with the public." As Pat said to his 'oman—"Do as *I* bid ye an' I'll not bate yez."

— Our Illustration.—The sketch of the promising Young Artist, whose portrait illustrates our present number, not having been received, we have to go to press without it. Mr. Carden leaves for San Francisco, Cal., on the 20th inst. We can commend him as a most excellent artist to the good people of that city.

—Messrs. Wm. & Peter Neff have sent us a circular introducing the Melainotype, or photography on enamelled iron plates. We have heard these highly spoken of, but have never seen them, and therefore we give no opinion in regard to them. Mr. Peter Smith, No. 36 Fifth street, Cincinnati, Ohio, is the general agent for the sale of patent rights. Price $20.

REV. ROB'T R. RAYMOND.

Negative by Barnard & Nichols.

SUGGESTIONS OF SUBJECT TO THE STUDENT IN ART.*

BY AN OLD TRAVELLER.

CHAPTER V.

The midnight Sun—Repose in the Wilderness—The World lies sleeping—Beatific influence of a beating—Imeritia to witness—Good fortune of the Painter—He enters protest—Woe is me! for the *semper eadem*—Treasure trove!—A dog that's *new*—A better time coming—Penitence—Results—The Princess at Tewkesbury—Edward the King—The Son of Henry—Richard of Gloucester—A Leave-taking—Elizabeth Woodville and, Elizabeth "Porphyry-genita"—Her Brothers, also born in the Purple—An olden Tale of Wood-craft—Where are the Sheriff's eyes?—The Liege-man's Ressolve—Doings of little Fiction—The Birds are coming! Felicia Hemans—Wordsworth—Aristophanes—Division of Labour—Commisariat of the Magpie family—The Counsel of Antipas—The Ethnarch before the Sanhedrim—Simeon, whose name was Sameas—The Tetrarch beside the Fountain—Espousals of the Asmonean Princess—The Feast of Tabernacles—The Death of Aristobulus—Arraignment of Mariamne—Defection and Death of Alexandra—The Sons of Mariamne—Costobarus the Idumean—Gadias and Dositheus—Lapidation of Tero—Last Hours of Pheroras—Antipater the Son of Doris—The Close of all.

HE interest attaching itself to the Exhibition of works by German Artists, last year holding its third anniversary in London, was much increased by the many beautiful landscapes adorning its walls: those of Norwegian Forest and Fjord were more particularly remarkable, but among them was uot one of those life-like reproductions of the MIDNIGHT SUN, for which Becker of Darmstadt, Saal of Heidelberg, and other German artists, have obtained a merited reputation.†

Among the works of the last-named painter is one,—much admired in the Austrian capital, and subsequently at Prague,—representing the Alps that rise above the Guldenbrands valley, as they lie under the deep crimson and rich rose tints of the midnight sun, in the months of June and July. The picture is one of unusually vast dimensions, a circumstance which I mention here, because, in a painting of this kiud, size—if not, as in architectural effects, an element of beauty, is at least an advantage to be appreciated.

The scene chosen by the artist is a wild valley strewn with rocks, between which there grow painfully and reluctantly a few coarse herbs and stunted shrubs; in the back-ground is a range of high peaked mountains covered with snow—although we know that the season is midsummer, and the day that of St. John's festival—their grand and silent forms are reflected in the dark waters of a wide extended Fjord, now still and silent as themselves: over this waste of mountain, rock, and water, there shines the strauge, weird, mysterious light of the midnight sun.

In the farthest distance the higher Alps are tinged with a delicate rose-hue, while the shadows of the lower range are blue and cool; but the bare gigantic rocks of the fore-ground are glowing like molten steel beneath the fervid beams, for they are still fervid, midnight though it be. Towards the far left of the pictnre, which exhibits a vast space, as we have said, the light is varied; a less glowing, yet still brilliant tinge of red is shining over all, and in the pale blue sky of this portion of the work are scattered, at wide intervals, great piles of clouds in strange fantastic forms, yet such as we have all seen at times in our own beautifully varying heavens.

* Continued from p. 166.

† Since writing the above, it has occured to us, that the two previous exhibitions of the German artists may have made our youngest student acquainted with these works, but the writer was not in England on either of those occasions, and cannot at the moment refer to the obvious sources of information.

But perhaps the most peculiar characteristic of this truly wondrous scene, and that which most effectually distinguishes it from every other, familiar to the dwellers in more southern climes, is the clear perception forced upon you that, despite the growing sunshine, it *is* midnight; profound solitude, dead silence, inviolate stillness, all betoken the hour of universal repose: the painter has not permitted any human form to appear; silently, and with very slow movement, a rein-deer is crossing a low hillock, but, beside him, not a living mortal is seen. Yes, you are made to feel that it is midnight, and if you could venture to speak in that solemn presence, it would be in the lowest of murmurs only. But can you speak?—by no means, it is not the time for converse, nor yet for movement, and being here, in the midst of this great pause of life, you sink down quietly into the couch of soft mosses and beside the stilly waters, and you take part in that calm and trusting repose in which the beautiful creatiou is all lying, child-like and helpless, yet softly breathing and in blest security, beneath the beneficent guardianship of the Father Supreme.

The rein-deer mentioned as passing across this strangely solemn "place of rest,"—for to this, notwithstanding the rudeuess of the features, is the scene here depicted consecrated by the potency of the hour—the rein-deer, I say, contributes greatly to the force of the general effect, by its singularly unrestrained and leisurely demeanor: this is not the moment for haste, there is nothing waking but himself, the beautiful world around him is all his own; his step—nay, he scarcely makes a step, he is only about to do so in good time—gives clear intimatiou of his perfect ease, and this attitude of the auimal has been judiciously adopted by the painter, being, as it is, in perfect harmony with the profoundly touching scene he has depicted.

There is a picture of similar character and also of great merit, but with different treatment, by Leu of Dusseldorf, to which I would fain call your attentiou; but uncertain whether both may not have been exhibited in our country last year, I refrain from doing so, since, in that case, they will most probably have been discussed by the Critic in Art, who takes possession of the whole subject, and does not confine himself, as is the case with the preseut writer, to the mere choice of the theme.

"Blessed is he who hath got himself well beaten, for he shall mend his manners,"—such is the purport, or nearly so, of an adage uot unfrequently heard in Imeritia, and if we cannot subscribe cordially to the truth of its averment, neither is this a convenient opportunity for proving the fallacy thereof. Let us even assume it true for the moment, and that accorded, how fortunate is your case, oh ye painters, and how effectually shall your manners be mended!

For such an amount of "stick-meat" as they are making you eat! *Ye Bogh!* as the Muscovite says,—and a learned man is your Russ, wheu the *batogs* are in question—they have provided you with rods of every growth and thickness; you have but to choose and must by this time have decided which tree you like best, unless you are very difficult indeed: at all events you will have acquired a critical judgement in the discrimination of *varieties*.

Right and left you are getting it—blows are raining from every point of the compass and all at once, so that, beneath which side of the hedge you were best take shelter must be a question just now puzzling you mightily, the rather as you do not all seem to be largely gifted in the bump of find-which-way-the-wind-blows-ativeness, if we are to judge by the fashion in which you place some of your poor creatures *a l'abri*, when you have first exposed them to pitiless storms. For proofs of this, I refer you to *qui de droit*.

"They are being very uncivil persons, these Critics!—and why should we care for them? We won't! for say they have some show of right on their side, wheu they abuse Blank Blank, of Blank, and demolish What's-his-name, and tear in pieces no end of other fellows, yet MY picture of—never mind its title—is a good one, and if they have not the wit to discern its merit, so much the worse for them."

Well, that is all very true perhaps, and argumentative

beside,—"if we had but the wit to discern its force," and clever too perhaps, and above all useful, for criticism will be doubtless put down by its eloquence, or if not, it ought to be, but in despite of your oratory, the critics are *now* grumbling, and they *will* grumble. Why, they maintain—But no, we won't repeat their talk of "this not right" and the other "all wrong"—why should we, since you don't intend to profit by it? Let us rather confine ourselves to what concerns our own especial matters, and hear what they say of that ceaseles iteration whereof they make their plaint. One deplores what he is pleased to call "the yearly increasing tendency of artists to repeat themselves," and adds, "this perpetual repetition would be bad enough if the pictures were good, but as things are!"

"Enough of him!"

Hear the next then—"This never-ending recurrence of poor and meaningless subjects has been long matter of universal complaint. This year we are more than ever oppressed by ——"

You don't like that neither? Let us try a third—"Weak and shallow! what has become of the rich invention once——"

You wave your hand impatiently, you will not have that *non plus*? but there is then no hope of pleasing you, for all is in the same tone! One declares that "even of the good pictures, people are disposed to speak reproachfully, after counting the number of times each subject is repeated in every essential point, all over the galleries." He further asks, "Why must we have the same Italian boys in all sorts of disguises and in half a hundred exhibitions?"

Complainant then proceeds to specify cases wherein the same figures are presented perpetually with only the slightest difference, but we do not give place to the instances—our remarks are general—not particular: he adds piteously, "These children we have seen *ever so many times!*" And hath he so? the poor good man! But are you not ashamed to becheat him of his reasonable expectations? and have not things come to an evil pass when a good friend and warm lover of yourselves and your works is reduced to self-gratulation over "this dog, because he is *new* to us?"

For observe; what the writers I now cite are complaining of is, not things bad—but things old—"iteration"—omitting the malediction—"iteration is the burthen of their Jeremaids,—"Who shall deliver us from these weariful self-repeatings?" they exclaim; and they are right. One remarks, and certainly not without cause—"There is an utter absence throughout, of pictures from Scripture, from English history, from English poetry, and even from English fiction."

And they are your friends who speak thus, they are those who wish you well, and who wish well to Art. Yet these it is whom you compel to ask you—Is there no such thing as a Goldsmith in the land! has no tradition of a Lemprière ever penetrated your haunts? or could you not atleast contrive an introduction to some penny story-book, (in this our day, when the supply of intellectual needs is not particularly meagre), with, it may be, an apology for a picture upon its front, by way of rousing up your imagination a little?

Nay, but wherefore will you suffer these discourtesies to be addressed to you? and how long shall the regrets of your friendly monitors be rendered yearly more profound? "No scripture subject—no history—not even fiction."—You will surely not let further cause be given for these too justly merited accusations, since it is certain that the power of preventing them is in your own hands.

Of the scriptural subjects we will not now speak, we are not in fitting mood for the discussion: but what prevents you from turning to history? that of every nation lies open to you, not one shall refuse its stores,—or to poetry, and in that bright region you shall find equal riches; meet as cordial a welcome. For the realms of fiction, I do make mine avowal that they be somewhat of the wildest; they demand a peculiar kind of courage from him who shall enter on quest therein, but at worst you shall find a very plethora of provender, and if it be not of the daintiest, let us have it nevertheless, since better may not be; food of any kind is better than famine. Give us something. Let it no longer be said, as of late it hath been and with too much truth, "Our English artists are neglecting books and men, they shun galleries and whatever tends to promote the love of Art in its highest phases, as if some pestilence were in the air of all that elevates. Many have even severed all connection with the realms of fancy and seem to have abandoned themselves to the rule of common-place."

It is true that the critics have as yet but the light skirmishers before them, and when the great guns of the Academy are brought to bear, they may see cause to change their tone. And you will perhaps say "Neither is this the heaviest artillery of criticism that comes rattling about our ears." Perhaps not, but if the *mitraille* be effective, one gets pretty well peppered even by that, and methinks the shower falling on this occasion is none of the lightest. Then the weapon of your assailant is ever the more sharply penetrative when he has pointed it with a truth, and I ask you if these that are now flying about you do not "hit in the white" every one?

Still, it is not I who will consent to despair of a good time coming, had we not the dawn of it in the very last year's works? were there not the —— of —— but no — there shall be no names or titles specified, we know what we know, and by and bye we shall have better still. Even now you do not all wear those defiant looks of "Harry, who didn't care!" with which you began to listen, as we repeated to you what your friendly critics are saying. There are some of you indeed who seem to be getting your penitent faces on. Good boys! One has even crept into a corner, slate and pencil in hand; he has determined on some grave exposition of History! you divine it by the importance of his preparations. A second rubs his eyes—he has heard of the "fine frenzy rolling," you shall see now if he will not give us poetry! As to you third! I think he must have borrowed the milkman's chalk: what has made him so short of tools, and how does he mean to employ the loan he has secured? perhaps he will regale us with some preparation from the *cuisine* of fiction, we shall see.

Suppose we look over the shiny shoulder of each toiling urchin—and I would that some one might paint me this studio bodily, every tiny man depicted as he is bending him to his task,—what may History be doing to begin with?

None so bad upon my word! He has made us a tent—a regal pavilion rather—ample of dimensions and richly appointed; the period he has chosen considered, for you see that the warrior figures who occupy the interior are Edward IV., with his brothers, Richard of Gloucester and George Clarence. Other leaders are also there, Lord Hastings among them; but who is the handsome youth so boldly confronting the king?

Alas, it must needs be the unhappy son of Henry VI., and our student has given us the tragedy that closed the battle of Tewkesbury.

King Edward is asking—as we know he did—"How darest thou so presumingly, with banner displayed, to enter this my realm?" And the youth—according to Speed—is replying: "It is not thy realm, but that of thy sovereign and mine, King Henry VI. and I come to recover my father's most rightful inheritance."

"Then," says the same historian, "did King Edward, with his gauntlet, dash the prince on the mouth, whom Gloucester, Clarence, Hastings, and the rest did then most shamefully murther, even before the face of the king."*

Another moment and these acts of violence shall be in course of their unhappy progress; but our limner has pleased to give us the point of time as above stated—and the wiser man he:—not badly done either. King Edward, handsome, but of hard and doubtful expression, with as much cruelty of aspect as a face still youthful might well express; Richard, also very young,—not twenty in fact—no vulgar hunchback, a somewhat ungraceful person, but with more of intellect on his brow than belongs

* So Speed and other chroniclers; but we are not to forget that Bernard Andreas, a well-accredited author, writing within less than forty years after the event, declares Prince Edward, son of Henry VI., to have been killed in the battle of Tewkesbury, and the story here related is by many affirmed to have been invented by the enemies of the House of York.

to any other in the assembly; George of Clarence is weak and treacherous *looking*—and rightly so, for a notable traitor he was, as the unhappy Warwick, his father-in-law, had already learned to his cost. All are good and characteristic figures; wherefore, borrowing words of encouragement from that kindly personage, Dame Juliana Berners, I cannot but say—"Loke ye do ever soe, my dere child, and ye shall come good speede."

But he turns his slate! The good fellow! he has done us another; who said there should be no more history? Edward IV. again, but this time with his Queen, Elizabeth Woodville and her three fair children: Edward V., a two-mouths' king; Richard of York, now turning his sweet bright face of six years old, towards the uncle, who was afterwards to incur the infamy of being his murderer—whether justly or not has never been made clear; and Elizabeth, doomed subsequently to become the detested wife of Gloucester's mean successor—Henry of Richmond.

Not so rigidly matter of pure and authentic history as the last picture, this, which is apparently a leave taking for some short absence, is yet correct as regards the personages depicted. The two princes—Edward the king, and his brother, Richard of Gloucester, are much older than in our previous study; the period is indeed that immediately preceding Edward's last and fatal illness, as is manifest from the age of the children, nor have the excesses of his life failed to produce effects that are even now visible; Richard is urging his brother to hasten, but Elizabeth—her beautiful face much careworn—has still some words to say, and the king pauses to listen. Her eldest son is standing close beside her; he eyes his uncle Richard doubtfully, but the younger boy, a child of little more than six years old, is clearly preferring some childish suit to Gloucester, whom he holds fast by the hand. It is an effective picture; said we not well—"there's a good time coming."

Now for my little Poetry: he comes tossing his bright curls well from his brow, and there is a right saucy look in the merry bright eye of him; it is not in melting mood that he has been working, and so may be seen. He is holding his picture on a fat round rosy knee;—such have I seen in a certain chamber of the Vatican;—who will fail to remember the instance? An old-world tale of archery perfai: The "proud sheriff of Nottingham,"—no less a personage—hiring Little John "to be his manne," as he did to his sore repentance and heavy discomfiture; a fact that none of us can have forgotten. But what possesses the sheriff to trust him?—might he not see the roguish purpose of the tall archer in those bold laughing eyes? No wonder my Poetry's two good-looking blue orbs should themselves laugh as he recalls his work. The sheriff too, a very comfortable sort of personage, not too obese,—my "dere childe," Poesie, has too much good taste to fall into caricature;—beside that, so keen a lover of wood-craft as was the sheriff, must needs have kept some measure in the matter of girdle. The scene is a sort of chase, at no great distance from the town, since we have the towers of a cathedral in the extreme left, with some portion of a rich and stately abbey appearing beneath the magnificent oaks of the middle distance. Well done! and *very* well done too, my Poetry, also. The words that served to inspire him, after he had well rubbed his eyes, would seem to have been these that follow:—

"Lithe and listen gentle-men,
All that now be here,
Of little Johan, that was the knightis man,
Good mirthe ye shall hear.

* * * *

"Three times little John shot about,
And alway cleft the wand,
The proude sheriffe of Nottinghame,
By the marks 'gan stand.

"The sheriffe swore a full great oathe,
'By him that died on tree,
This manne he is the best archere
That ever yet saw I me.

"'Say me now, gight young man,
What is now thy name?
In what country wert thou born
When-as thou wast at hame?'

"'In Holdernesse I was born,
I wis that from my dame,
Men called me Reynold Greeneleaf,
When-as I am at hame.'

"'Say me, Reynold Greeneleaf,
Wilt thou dwell with me,
And every year I will give thee
Twenty mark to thy fee?'

* * * *

"'Now so God me help,' said little Johan,
'And by my true lewtee,*
I shall be the worst servaunte to him,
That ever yet had he!'"

Without doubt he will; and this is clearly the thought which it has seemed good to our painter to reproduce on his face. How is it that the sheriff does not see it there? Of the "mirthe" that ensued from the fact that he had not the faculty for doing so, another good picture might be made, and perhaps will be; but of this at some future time. We have now to look after little Fiction.

He has given us a solitary figure only, but full of promise; let us look at it somewhat closely. A subject taken from the very prince of his class—even Defoe; and the moment is one abounding in the deepest interest. It is that when the hero of the book—everybody's hero, for it is Robinson Crusoe—describes his terrible discovery of the foot-prints on the shore.

"One day it happened that, going to my boat, I saw the print of a man's naked foot on the shore, very evident on the sand, as the toes, heel, and every part of it. Had I seen an apparition in the most frightful shape, I could not have been more confounded. My willing ears gave the strictest attention. I cast my eyes around, but could satisfy neither the one nor the other. * * * Struck with confusion and horror, I returned to my habitation. That night my eyes were never closed."†

Manifestly they have no chance for doing so: dread and anguish have murdered sleep. You have but to look on the lone figure before you to be sure of it, and if, in their effective simplicity, the words of our author are eloquent, so also is this rendering of them by the painter. The utter loneliness of the solitary man is impressed on you with a force there is no resisting; you do not look in the distance for any other figure—you feel that there is none. Solitude has no partner in her reign, save only Silence, and she too is absolute; the stillness is unbroken, the water laving the boat can make no sound, for it lies altogether without motion, and it is the slight and almost imperceptible movement of the boat itself that alone breaks the level of the waveless shore.

Well done to Fiction also, then, and there shall be no more talk of slate-pencils or the milkman's chalk; 'tis a pleasant thing to be able to shake hands cordially with one's "dere children" all, and to say with the genial abbess of St. Alban's, "ye shall speede welle."

For the last six weeks has one of Nature's gladdest and most entrancing voices been calling us forth, that proceeding from the rejoicing birds, namely: nay, the woodlark has sent out her invitations even longer than that, and despite the acrimony of the weather, she found courage to make her sweet notes heard even in the doubtful days of February. March brought us the blackbird and thrush, nor were there wanting snow-drop and brilliant violet to give them welcome; these greeted even your wearied eyes, oh, unhappy ones, who do not escape from the far reaching breath of the toiling town, but for ye—beloved of the kinder gods—who may take your way deep into the unspoiled wilds, there is less sophisticated company, and whithersoever

* Loyalty.
† "Life and most surprising Adventures of Robinson Crusoe, of New York, Mariner," edit. 1791, p. 65.

your path may lead you, there shall rise the music of a gladsome brotherhood to greet your advent withal.

Is your way across the fields, you find the joyous bunting crossing your path in his merriest mood; keep forward to the bright streams, and you shall have the reed-sparrow to bear you company; pursue the breezy upland, and lose yourselves among the sheep-walks,—there you need have no fear of oppression from too profound a solitude—pleasant is the society awaiting you there, were it only in the person of the stone-curlew; or if you more affect the woodlands, there will come the willow-wren to cheer you with her note. On the downs are the wheat-ear and the lap-wing, to say nothing of their agreeable neighbor the winchat, snugly nestling amidst the furze. Blithesome now is the ring-ousel on a thousand hills; or should none of these delicious haunts be within your reach, and you have but the beach of the coast for all appanage, even there shall the sea-mew be found hastening to exhibit for you the most graceful measure that he can dance with his gay red legs, as who shall say "not even amidst unpromising sands shall you fail to meet some creature rejoicing in the happiness provided by Nature's bounty for all."

To the glad arrival of the passage-birds, there will be none so cold as to profess indifference. Who is there that does not think long of her coming, if the nightingale delay to follow her mate* beyond the last days of the showery April? Hear, also, the truth and the wisdom that come to us with these beloved wayfarers, when adjured to declare their mission by such as know how to enquire aright. It is Felicia Hemans that questions them; these are her words,—

"'Birds! joyous birds of the wandering wing,
Whence is it ye come with the flowers of spring?'"

And they answer promptly—

"'We come from the shores of the green old Nile,
From the land where the Roses of Sharon smile,
From the palms that wave through the Indian sky,
From the myrrh-trees of glowing Araby.'

* * * * * * *

"'And what have ye found on the monarch's dome,
Since last ye traversed the blue sea's foam?'

"'We have found a change, we have found a pall,
And a gloom o'ershadowing the banquet hall,
And a mark on the earth, as of life-drops spilt,—
Nought looks the same save the nest that we built.'

"'Oh, joyous birds, it hath still been so,
Through the halls of kings doth the tempest go,
But the huts of the hamlet lie still and deep,
And the hills o'er their quiet a vigil keep.
Say, what have ye found in the peasant's cot,
Since last ye parted from that sweet spot?'

"'A change we have found there, and many a change,
Faces and footsteps and all things strange.
Gone are the heads of the silvery hair,
And the young that were have a brow of care,
And the place is hushed where the children played,
Nought looks the same save the nest that we made.'

"'Sad is your tale of the beautiful earth,
Birds that o'ersweep it in power and mirth!
Yet, through the wastes of the trackless air,
Ye have a guide, an shall *we* despair?
Ye over desert and deep have passed,
So may *we* reach our bright home at last.'"

Hear, too, what Wordsworth finds to say to your oldest of old acquaintance, the heart gladdening skylark—

"Ethereal minstrel! pilgrim of the sky:
Dost thou despise the earth where cares abound?
Or, while thy wings aspire, are heart and eye
Both with thy nest upon the dewy ground?
Thy nest, which thou canst drop into at will,
Those quivering wings composed, and music still!

"To the last point of vision and beyond,
Mount, daring warbler! that love prompted strain
('Twixt thee and thine a never-failing bond),
Thrills not the less the bosom of the plain.
Yet mightst thou seem, proud privilege! to sing
All independent of the leafy spring.

"Leave to the nightingale the shady wood,
A privacy of glorious light is thine,
Whence thou dost pour upon the world a flood
Of harmony, with rapture more divine.
Type of the wise, who soar, but never roam,
True to the kindred points of heaven and home."

Of the ability exhibited by birds, when it pleases them to become artificers, let us hear what Arisophanes declares:—

"Birds, with their own good hands, have wrought these works,
Bricklayer, nor stone-mason, nor carpenter,
But birds with their own hands—'tis marvellous!
From Lybia came about three million cranes,
Who had swallowed stones for the foundation: then
The cornrails, with their beaks, did chip and hew;
The storks, another myriad, bare the bricks,
While water, to the air from underneath
Was brought by sea-larks and the river-birds.
Pisthetœrus. And who with mortar served them?
Messenger. Herons, with hods.
Pisth. And how did they the mortar throw therein?
Mes. That, too, was managed, sir, most dexterously,
For by their feet the geese, with understroke,
As 'twere with trowels, cast it in the hods.
Pisth. Oh, what may not by help of feet be done!
Mes. Aye, and the drakes, by Jove! with aprons tucked up,
Bare bricks, and after them, like serving-lads,
Flew up, with cement in their mouths, the swallows.
Pisth. Who now would pay hired laborers for his work?
But, let me see, the timber-work o' th' wall,
Who wrought at that?
Mes. Those carpenter-fowls, the hickwalls,*
Who with their beaks did hack the gates out workmanly,
And of their hacking the like sound arose
As in a dock-yard."†

Now we do not bid you paint the good drakes with their aprons tucked up, nor insist on a picture of herons stilting along under hods of mortar as aforesaid; yet has the artist occasionally made him merry with "metal" infinitely less "attractive;" and if you do nothing worse than reproduce the old Greek dramatist, all the easier shall be your shrift. Meanwhile there is a story told by an observant traveller in our own country, wherein the power of combination, not unfrequently refused to animals by writers who treat of their instinct, is singularly exemplified. More than one good name, well-honored in Art, might be cited, whereof the owners would indubitably have called pencil to aid had they witnessed the little incident thus described by the traveller in question.

"On the road between Huntley and Portsoy, I observed two magpies hopping round a great bush within the garden of a poor-looking house, and remarking something peculiar in their proceedings, I stopped to see what they were doing. The countryman then told me, that these magpies had built there during several successive years, and had brought up their young in that bush; he added that they had not only barricaded their nest, but had so strongly encircled the bush itself with briars and thorns, that no cat or hawk could penetrate to the young; nay, so formidable were their defences that it would cost even a fox, cunning as he is, some days of painful labor before he could get into the nest. I found that the whole length of my arm did not suffice to reach from the outside of the bush to the centre, so that man himself could not break through without the use of a hedge-knife, hatchbill, or something of the kind. The parent-birds fed their young with frogs, mice, worms, or any thing living within their power to subdue."

So far our traveller loquitur. One day it chanced that the mother magpie had ventured to attrck a rat in the absence of her mate, but after a long battle the quadruped was on the point of getting the best of it, and was fast making off, when one of the young ones came from the nest and joined the fight; a conflict of great animation then ensued, but their antagonist was too many for both mother and son, and the rat would still have escaped had not the father happily arrived with a dead

* The male bird is known to arrive invariably some fifteen days or so before the female.

* Hickwall, the woodpecker.

† "Birds of Aristophanes," Cary's translation, p. 109.

monse in his bill, this he deposited safely, then adding his forces to those of his wife and heir, poor Ratibolan was eventually killed, when that handsome piece of venison, which had previously formed his personal identity, went to swell the stores of the magpie larder.

After that, do not say that birds are incapable of combining; above all, admit their talents for performing the duties of the commissariat.

"Stand not before the Shanhedrim as stands the guilt-stained, or the suppliant, but appear thou in thy might and thy splendor; be the purple of thy sovereignty the robe of thy wear; and let the most approved and faithful of thy guard keep watch around thee."

Such were the counsels of Antipater, or as, in the Hebrew form, he is called, of Antipas, the father of Herod, when the latter, summoned to answer for the death of Hezekias, had finally determined to appear before the great tribunal of the Jewish nation in awful conclave assembled. For their president the Sanhedrim had the high-priest Hyrcanus, grandson of that renowned pontiff;—one of the most distinguished among the Asmonean rulers of his people,—the great John Hyrcanus, and inheritor of his name no less than of his office. Well had it been for the Hebrew nation had he likewise inherited his grandsire's indomitable force of will; but this boon had been withheld, and in the countenance of the high-priest you detect the weak irresolution of his character.

The respect of Herod for his father was unbounded, it was equalled only by his love; had the wise and able Antipater enjoyed length of days, his son might have developed only those finer qualities which he certainly possessed, but the father died untimely, and from that misfortune dates the downward tendency of Herod.

Conforming to the counsels of that beloved father, it is in his "pride of place" that the young Ethnarch—he was then sole governor of Galilee—advances to confront his judges; martial forms precede, and open to him a broad free path up the hall of justice. Herod is in the first summer of his youth, and of faultless beauty. Thus it is that you shall paint him: he comes arrayed in robes of flowing amplitude, and of the richest texture; jewels of mighty cost lend all their lustre to heighten the gorgeous effect of his imposing presence. Nor are those who should repress that insolence of demeanor wholly uninfluenced by his boldness: the awful patriarchs wear looks of doubt and anxiety; some are gathering their robes around them as do men who are meditating flight; but there is one who rises superior to that unworthy weakness, and even more beautiful than the brilliant youth of Herod, is the reverend age of him who bends on the glittering Ethnarch the full majesty of his reproving gaze, after he has exhorted his brethren to remember their duty.

These are some few of his words, as recorded by Josephus—read them; and there cannot fail to rise before you that high nobility of aspect, which it is for you to render permanent on your honored canvas, in the person of the grave and reverend speaker.

"Oh, you that are assessors with me, and thou, Hyrcanus, who art our chief, I neither have ever myself known such a case, nor do I suppose that any one of you can name its parallel, that one called to take his trial at our hands, ever stood in such a manner before us. For every man, whoever he be, coming to be tried by this Sanhedrim, presents himself submissively, as one in fear, and who would move us to compassion: all come hither with hair dishevelled, and in the garments of mourning; but this man Herod, accused of murder, and called to answer an accusation so heavy, stands clothed in purple, his hair finely trimmed, and his men of war around him. Now if we condemn this man, he may slay us, and shall himself escape; neither do I now complain of Herod himself in this matter; he is more concerned for his own safety than for your laws. But know ye, my brethren, that God is great, and by this very man, whom ye, for the sake of Hyrcanus, will now absolve, shall he punish both yourselves and your chief."*

Thus spoke Simeon, whose name was Sameas,† and the effect was immediate; some anxious faces still remained in the assembly, and so you must depict these men of feeble heart; but, turning their eyes on the noble Sameas, are others worthy to be his compeers; let the dignity and distinction of their majestic persons not be lost in your hands. These men are prepared to affim his decision, and will uphold the sanctity of their law to the death. But the high-priest extends his hand, he defers the discussion to some future day, the Sanhedrim is adjourned, and the Ethnarch is saved.

Look closely at Hyrcanus, for this is your moment, and it is now that you must paint the picture. No worthy successor of the Asmonean princes, there is yet a certain dignity in his bearing as he utters a few words whereby the assembly is dissolved; notwithstanding his deplorable irresolution of character, you have still the descendant of a noble race for your study. Nor is Hyrcanus actuated solely, by unworthy motives, in thus shielding Herod from the ire of the Sanhedrim; it is not for dread of Sextus Cæsar that he labors to save the Ethnarch, the letters of the Syrian general may have had their effect, but "Hyrcanus loved the youth as his own son," says Josephus; and at this time Herod was not unworthy of his affection.

Neither was the act of which he was accused a murder. Hezekias, a noted robber and assassin, had been justly punished—the whole fault of Herod was that he had put him to death without first obtaining the sanction of the Sanhedrim—an illegal action, but not a crime. Thus there is a conviction of his own rectitude on the proud brow of the accused, and this lends valuable aid to the fine effect you will produce by the mere portraiture of this magnificent beauty.

Your next picture of him is wholly different, and must show him under a less favorable aspect. His first great crime has been committed, he has caused the secret murder of Malichus, and if his provocation has been great—for by Malichus, his beloved father, even Antipater has been foully poisoned—‡ so also is the guilt now resting heavily on his soul, and you have no longer the consciousness of an upright intention to depict. Oh! "*Facilis descensus Averni*;" let us never forget it!

> "*Facilis descensus Averni:*
> *Sed revocare gradum, superasque evadere ad auras,*
> *Hoc opus, hic labor est.*"

His first youth has passed; Herod, now Tetrarch, is in the force of his manhood; thus it is a figure of imposing stateliness rather than of youthful grace, that you have here to set before us. He is standing beside a fountain within the great court of his palace; pain and grief are in every feature, for the brother of his dearest love—the brave and sincere Phasaelus, has fallen into the toils of the wily Parthian, from which he shall escape only by a painful death.§ Herod feels that the power to save that beloved brother is not with him, although he would give his heart's blood to secure it, and the iron hath entered into his soul.

Bitter is the expression with which he follows the retreating figures of the Parthian messengers, who have come to entrap him also, if that be possible; but he distrusts their purpose, and they are departing foiled. Soldiers of his guard recline beneath the shade of the portico surrounding the court; they mark his displeasure, and some are placing a ready hand on their wea-

* "Nor did Sameas fail to prove a true prophet," says Josephus; Herod, when king, slew all the members of Sanhedrim, Hyrcanus included; Sameas alone, "whom he honored for his righteousness," was permitted to escape, although he still persisted in maintaining that evil would befal the Jews at the hands of Herod. See, Antiq., b. xiv., c. 9, sect. 4.

† Reland observes, that the Talmudists confirm this account: they call Sameas, Simeon the son of Shetach. Ibid, *note*.

‡ See "Wars of the Jews," b. i. c. 11, sect. 8.

§ "The manner of that death is related on this wise: refusing to abandon Hyrcanus, who as well as himself, had been lured into the power of the Parthians by false pretences, Phasaelus, who might else have escaped, was straightway bound. He then tried to dash his head against the walls of his prison, but his bonds prevented him from striking an effectual blow, and a physician, subsequently sent to tend him, put poison into the wound. Of this it was that Phasaelus died, but, being aided by a certain woman, he found means to send an account of the whole to Herod, saying, "Now shall I die content, since my brother will avenge my fall."—Antiq., b. xiv., c. 13, sect. 10.

pons, but their commander gives no sign and they retain their place. Crossing from the colonnade to the fountain, is a woman of regal beauty, though no longer young, this is Alexandra, the daughter of Hyrcanus, and mother of Mariamne, Herod's betrothed but not yet wedded wife. She comes to implore that he will not go forth of the city, as the treacherous Parthians would fain have him do; he does not yet perceive her approach, but the position of each figure is favorable for your purpose; let us have them as they now appear.

Your third picture shall be one of glad triumph—alas, that it must be the only one of that character. Woe, woe for Herod! New and fleeting were the moments of happiness permitted to brighten that storm-tossed life. This is the last.

The scene is Samaria, the event to be delineated is the marriage of the Tetrarch with his long-loved Mariamne. How radiant was her beauty you well know, and the joy of the hour has restored a portion of their early splendor to the looks of Herod. The gorgeous accompaniments of these espousals do not need description; you are familiar with their details, they are such as befit the regal state of the affianced, and all is brilliant festival. One face alone has turned a look of menance on the bride, but there is a world of evil in that glance; half concealing its malignant fire beneath the sheltering veil, it yet glares balefully from the glowing eyes of her who was soon to become the evil genius of the wedded pair. This is Salome, the sister of Herod; even now is she preparing a heavy future for the hapless Mariamne, and of one among the earlier results of that fiend-like woman's influence shall be the fourth picture in your series.

Evening is falling over the shadowy palm-trees of the Royal Gardens; the fervid evening of an eastern clime. It is the feast of Tabernacles, and after a day of high revelry, the brilliant guests are gathered about the fountains. A youthful band surrounds the sparkling waters in that ample basin, and Aristobulus, the young brother of Mariamne, not then eighteen, and described as a very miracle of beauty, has been persuaded to join them, as they plunge beneath the crystal lymph: together have the young men entered that unwonted bath, luxuriously are they disporting themselves in the delicious coolness—all is joy and exultation.

Now you will remember that the criminal ambition of Alexandra has imposed the burthen of the high priesthood on those young shoulders; but Aristobulus recks little of his unbeseeming dignities; gaily has the princely boy borne his part in the festival, and joyously have the peals of his laughter rung forth on the well-pleased ear of his mother and sister, as they recline at a distance beneath the sheltering trees.

But there is treachery in that seeming sport. Salome has taken part with those who have led Herod to believe the youth dangerous to his power: perhaps he was so, in the hands of the designing Alexandra, but he will menace no more. The young companions are full of playful gladness; each labors to plunge the other beneath the waters; loud are the cries of ecstacy as the revels go on, but all who gather round Aristobulus are not his friends; surely they keep him too long immersed! Alarm succeeds to merriment, there is a rushing and tumult; they have laid on the dark soft bordering turf a white inanimate form; you cannot see wherefore that marble stillness, for you are distant, but the agony of Herod, not all feigned, tells too clearly what has chanced. Doth not the Tetrarch rend his garments? —then Aristobulus is dead! and the unhappy son of Antipas has made a further descent adown the precipitous path to that gulf of crime which now yawns inevitably before him. Alas for Herod!

Years of fearful violence succeed, each marked by the searing effects of frequent crime and varied suffering. Deeply has King Herod dyed his hands in kindred blood; Hyrcanus, the grandsire of his bride, and Joseph, his father's brother, have followed Aristobulus. The latter had revealed to Mariamne the command of her husband, that in the event of his death she should not be permitted to survive, and when that became known to Herod he "was like one distracted, his anger made him stark mad; leaping from his couch he ran about the palace wildly, resolved on the destruction of Joseph, at which time his sister Salome took the opportunity and so moved him against Mariamne that he commanded to slay her also, but revoking that order out of his exceeding love for his wife, he caused Joseph to be put to death alone."*

But her escape was not to be for long; proud and resentful, the unfortunate Mariamne took no measures to conciliate her enemy; other charges succeeded, and she was at length brought to trial; the accusations against her were adultery and attempted murner, of both which it was known certainly, that she was innocent.

Here, then, is the melancholy scene you have next to depict. His councillors have assembled by command of the king, and before them is arraigned the wife he still so dearly loves. She is condemned, for so do those unworthy judges believe to be the will of their master. "A woman," says Josephus, "of excellent character both for chastity and greatness of soul; if she wanted moderation and had too much contention in her nature, yet was she endowed with many great and fair gifts; her beauty and majestic appearance surpassed whatever can be said to describe them, and the charms of her conversation were even more powerful than her beauty in the influence they gave her over Herod."

You behold then the kind of woman whom you have now to present to the future ages; no longer the brilliant bride, she is something infinitely more touching, more sublime—she is a faithful wife, a good mother, and a deeply wronged woman; so will you depict her. Her sentence she hears with calmness, for life has long been a weary load, but the serenity of her aspect is for one moment troubled; it is when her worthless mother, Alexandra, whom you perceive to be addressing her with flashing looks, affects to overwhelm her with reproaches, and is daring to express a belief in the truth of those who accuse her daughter, although none can be more firmly assured of Mariamne's innocence than is Alexandra.

By this act the wretched woman, tempted thereto by a mean terror for her own life, ensures the contempt of all who witness it. Even Cypros, the mother of Herod, and no friend to Mariamne, yet regards the raving Alexandra with abhorrence; she might even be led to plead for the condemned, although she, too, as well as Salome, has but too frequently felt the scorn of the proud Hebrew princess, to whom her Idumean birth was an offence and a stumbling-block; but her daughter is at hand; no ruth is in the heart of the vile Salome; she marks the anguish of her brother, she beholds him on the point of relenting, but the name of Sohemus escapes her lips, that sound has rekindled all his fury, and Mariamne is led to death. Fearful is now the misery endured by Herod: not this the splendid Ethnarch of the Sanhedrim; the rejoicing bridegroom of Samaria; nay, the figure of the king, as you must now delineate him, shows clearly that much has been performed and suffered, much of wrong-doing and its retributive sorrow, since last we met him at the Feast of Tabernacles, although the brightness of his pristine glory had even then departed.

The unworthy Alaxandra is his next victim; her base abandonment of her child did but serve slightly to prolong her miserable existence, and she dies unpitied; all remembering how the murdered Mariamne "gave her not a word, nor was discomposed at her peevishness, save that out of her greatness of soul she could not but feel concern for her mother's offence, and was grieved to see her expose herself by that unbecoming violence."† Thus Alexandra knew herself to be the object of univesral scorn.

The Idumean Costobarus followed Alexandra, with Gadias, Dositheus, Lysimachus, and others, until the sword of the tyrant had at length left him no friends to share his woes.

Next there conspires with Salome the first-born of Herod, even Antipater, the son of his Idumean wife Doris; their object is to ruin the two sons of Mariamne, Alexander and Aristobulus, and by their machinations these young men are brought to a deplorable end. But as if it had been decreed that no evil

* Wars, b. i., c. 22, sect. 5.

† Antiq., b. xv., c. 7, sect. 5.

thing should chance witho nt the agency of the doomed king, it is by himself that his sons are araigned before Cæsar, and even after they have been acquitted by the tribunal of the Emperor, it is by his own voice that they are condemned. They receive the pretence of a trial, at Berytus, and this concluded, those ill fated descendants of the noble Maccabees are taken to Sebaste,* where both are strangled.

Then it was that the old soldier Tero, Herod's last remaining friend, broke into his presence, declaring that "Truth had perished from the earth, and justice been taken from among men." "I am not able to endure these evils, O king!" exclaimed the veteran warrior, "and have resolved to devote this day, which thou wilt assuredly make my last, to one more and final attempt to causing thee to hear of things as they are." The old man then proceeded to describe the evils that must result from the course pursued by the king, who seemed for some moments disposed to listen: but Tero was ultimately cast into prison, and being subsequently accused of conspiring against his master, he was stoned to death at Berytus, as was his son, who had been involved in the accusation.†

And now why continue this melancholy series of pictures? why further dwell on the vast amount of wasted blessings and misapplied endowments that might have rendered the life of this lost king so glorious?—nay, but even to these our days, some lessons may be taught by the story: here however is its end. His days draw to their close, and thus does he approach it. Pheroras, the last beside himself now remaining, of Antipater's four son's aud Herod's well-beloved brother, is accused of designs against his life, the women of his household are tortured into admissions of guilt which is not believed to have had existence, but Pheroras finds means to clear himself: he is nevertheless commanded to leave the capital and retires in bitter resentment to his Teirarchy, where he subsequently falls sick unto death. Then revives all the old affection of Herod, whose love for his brethren was among the most powerful impulses of his nature, and he hastens to the couch of the dying Pheroras.

Here then will we meet him for the last time. The mere wreck of his former self, he bends sorrowfully over the couch of the sick man, who had registered a solemn vow to see his face no more, and had refused to return to the presence of the king when Herod had himself been at the point of death. Yet has Herod come hither uncalled and unwished for—nay, the pale face of Pheroras wears an expression of reproach, heart-breaking to the wretched brother, who is at this moment repentant. A woman is kneeling beside the bed, it is the wife of Pheroras, grief and terror are in her looks, she is couscious to a guilty knowledge that poison had been prepared for the king, but it is by the wicked Antipater, who has caused it to be brought from Rome by his freed-man Bathyllus, nor has there ever existed any intention on the part of Pheroras to use the drug against his brother. He has indeed supplied her unhappy self with a portion thereof, as a means of escape from the anticipated cruelties of the king, when he shall himself be laid in the grave. These things are made known after the death of Pheroras, and when the fears of his wife have caused her to attempt self-destruction. But we pursue the grievous theme no further, already has that "fire which glowed in him slowly," as says Josephus, commenced its ravages, and his remaining days are to pass in maddening torture. Even now, you have small trace of the stately monarch we formerly knew: that ruined form bent over the couch of Pheroras gives evideuce of suffering more terrible than that of the dying.

In his last paroxysms, Herod commanded the death of the wicked son of Doris, even Antipater, whom he always held in bonds. Presuming to indulge in rejoicing anticipations of his father's approaching death, the words of his first-born are repeated to Herod, and the result we have related. Five days after the execution of Antipater, Herod himself departed.

* Our readers will remember that when Herod had strongly fortified Samaria, the name of the city was changed, and it was thenceforth called Sebaste.

† Antiq., b. xvi., c. 14, sects. 4 & 5.

(*To be Continued.*)

From the Jour. of the Phot. Soc.

LONDON PHOTOGRAPHIC SOCIETY.

Ordinary Meeting, May 1, 1856.

Prof. Hunt, F. R. S., V. P., in the Chair.

The Minutes of the last Meeting were read and confirmed.

C. H. Clarke and G. S. Lefevre, Esqrs., were elected Members of the Society.

Before the regular proceedings commenced Mr. Matthew Marshall rose and drew the attention of the society to an advertisement of a Photographic Association, which contained on its Council the names of some Members of the Council of the Photographic Society. He therefore called on those gentlemen for an explanation as to how far the new Association was likely to affect the interest of the Society, or was antagonistic to it; and if this was unsatisfactory, to retire from the Council.

Mr. Fenton replied that it would be sufficient answer to say that the Members of the Council referred to had *not* retired; and that if they had had any idea that their was the slightest antagonism, and that they were not really forwarding the interests of Photography and the Society, and bringing Photography to bear upon Science and art in a way hitherto not accomplished, they would have already retired from the Council.

Mr. Shadbolt.—The matter struck me precisely in the same light as it did Mr. Marshall, and being a Member of the Council of this Society I thought it my duty, in the Council, to give notice of my intention to propose that a proper course would be for these gentlemen to resign; and the ground upon which I put it was this, that as members of a commercial body dealing in photographic materials they are improperly Members of the Council of the Photographic Society.

Sir W, Newton observed, that the objects of the Society being of a strictly scientific nature, and those of the association being of a commercial charactes, he did not see, sorry as he shoul he to loose Mr. Fenton how gentlemen could be on the Council of the Society, and also of the Association.

The Chairman suggested, that as no motion was before the Society, the Council should be allowed to discuss the matter first, and that it should be taken more fully into consideration at a future Meeting.

Mr, Marshall claimed the right, as a question of privilege, of having it then settled.

After a long discussion [in which Mr. Lake Price, Sir William Newton, Mr. Fenton and other Members took part], Mr. Price, Mr. De la Motte, Mr. Fenton, and Mr. Hardwich resigned their seats as Members of Council. Mr. Vignoles has since sent in his resignation as Member of Council.

Mr. Hardwhich read a paper "On the action of damp air upon positive prints."

Mr. Spiller read a paper "on a series of experiments carried out by himself and Mr. Crooks on the methods of preserving the sensitiveness of collodion plates."

The next Meeting will be held on June 5.

ON THE ACTION OF DAMP AIR UPON POSITIVE PRINTS.

By T. F. Hardwhich, Esq.

An examination of the properties of paper photographs would be incomplete without a determination of their behavior when exposed to air and moisture. This cannot be done correctly by the simple process of suspending the pictures, with water dropping upon them, on account of the accidental impurities always present in the atmosphere. I therfore enclosed each in a seperate stoppered glass bottle, with a little distilled water placed at the bottom, in order to keep the contained air saturated with aqueous vapor.

More than six dozen half-prints, on every variety of paper, were mounted in this way in the early part of January in the present year, and removed at the expiration of three months. Some were exposed to bright daylight during the greater part

of the time, whilst others were kept in total darkness. They were printed by various methods, toned in different ways, and mounted with or without such substances as appeared likely to exercise a deleterious action.

The number of prints operated on, and the care expended in their preparation*, will I trust give a value to this series of experiments, and establish the confidence of the Society in the results which have been obtained.

The list of experiments is as follows:—

No. 1. 7 prints developed on iodide, on bromide, and on chloride of silver, plain paper; simply fixed in hyposulphite; washed in boiling water. *Unchanged.*

No. 2. 4 ditto, ditto, the development stopped at the *red* stage. *Unchanged.*

No. 3. 2 ditto, prepared by Mr. Sutton of Jersey; negative process; toned by sel d'or. *Faded in the lightest shades.*

No. 4. 2 ditto, Mr Sutton's negative process; washed with boiling water. *Unchanged.*

No. 5. 2 ditto, printed by Sir W. Newton; his negative process with bromide of silver; slightly toned without gold. *A little faded in the half-tones.*

No. 6. 2 ditto, ditto; his negative process with iodide and bromide of silver; washed in boiling water, not toned. *Unchanged.*

No. 7. 6 prints, on plain paper; simply fixed; washed in hot water. *Unchanged.*

No. 8. 8 albuminized prints some simply fixed, others toned with gold; washed in hot water. *Some are unchanged, others have lost the gloss of the albumen and a little half-tone in isolated patches.*

No. 9. 3 albuminized prints toned with gold; washed only in cold water. *The image almost obliterated by mouldiness; the gloss of the albumen has disappeared.*

No. 10. 5 prints on paper prepared with caseine; simply fixed *Faded in the half-tones.*

No. 11. 8 ditto, on plain, and on albumenized papers; toned in old hyposulphite. *All badly faded.*

No. 12. 13 ditto, on plain papers; toned in a single bath of hyposulphite and gold. *A few unchanged; some have lost a little half-tone, others have faded badly.*

No. 13 ditto, printed by Mr. De la Motte, on Towgood's paper *immersed* in very dilute salting bath, and sensitized with ammonio-nitrate; toned in a single bath of hyposulphite of soda and gold; washed in boiling water. (N. B. The hot water makes the prints, prepared by this mode, very *red*, but the dark tones are regained by pressing the damp print with a hot iron.) *Unchanged.*

No. 14. 6 ditto, by Mr. Shadbolt; toned by sel d'or, fixed in ammonia; washed in cold water. *Uninjured in the half-tones; a little change of color in the English papers.*

No. 15. 2 ditto, toned by chloride of gold; on foreign papers; size extracted (one being a specimen of this mode of toning sent to the Printing Committee by Mr. Waterhouse of Halifax). *Unchanged.*

No. 16. 3 ditto, slightly toned in old hyposulphite, waxed with white wax dissolved in ether. *Faded badly.*

No. 17. 3 prints, waxed; toned in a bath of hyposulphite and gold (one, a specimen of the waxing process received by the Editor of the Journal). *All faded in half-tones.*

No. 18. 2 ditto, varnish with spirit varnished; one toned in old hyposulphite and gold. *The former faded badly, the latter unchanged.*

No. 19. 2 ditto, toned in a gold bath; coated with gutta-percha dissolved in chloroform. *Badly faded.*

No. 20. 6 ditto, untoned; smeared on the surface, some with paste, some with starch, and others with resin soap precipitated by alum. *All faded badly.*

No. 21. 4 ditto, untoned; a minute quantity of acetic acid, or alum, added to the water in the bottle. *All badly faded.*

No. 22. 1 photograph, previously converted into sulphuret of silver by chlorine and sulphuretted hydrogen. *Unchanged.*

In reviewing the above experiments, it may be remarked in the first place, that the test to which these prints were subjected was a severe one. When we consider the important influence which *moisture* exercises in favoring oxidation, it may, I think, be concluded, that an exposure of three months in an atmosphere saturated with aqueous vapor would be equivalent to *many years* in air of the ordinary degree of humidity, and that therefore prints which have survived such an ordeal are safe as far as oxidation by pure air is concerned.

Now the experiments showed that plain paper positives which had been *simply fixed* in hyposulphite, remained uninjured. Whether developed by gallic acid or printed by direct exposure to light, the result was the same; and hence we may infer that the darkened material which forms the image of photographic prints does not readily oxidize in a damp atmosphere.

But if by a process of toning the color and chemical composition of the image be altered, or when in addition to atmospheric air and water, certain deleterous substances are present, the experiments prove that the result is different, and that the print then becomes susceptible of oxidation. Let us discuss these two conditions seperately.

First, *fading may be influenced by the mode of toning the print.*—Sulphuration always has a bad effect. Out of several prints prepared in an old hyposulphite bath, not one retained its half-tints after three months' exposure to damp.

Toning by a single bath of gold and hyposulphite of soda may also leaves the image in a less stable condition than before; for it was found in some of the prints prepared in this way that the first shades of darkening by light had faded. It is important to notice that this happened particularly when the gold bath, having been long used, *was not in an active state.* In one experiment, out of two prints produced by the same process, viz. with chloride and Iceland moss, one prepared in a quickly acting bath proved to be highly permanent, whilst the other, resembling the last in color but toned in a feeble bath, faded when exposed to moisture. This proves that the view I have before advocated as to the change of properties which the fixing and toning bath undergoes by constant use, is correct, and that the solution at length tones by *sulphur* if the supply of gold be not well kept up. I found that the prints which faded in the moist air were far more readily injured by boiling water than those which did not fade, and this is one of the characteristics of toning by sulphur—that the tint quickly degenerates into a dull brown when treated with hot water.

Toning by means of chloride of gold appeared to be highly unsatisfactory. It would have been better, however, if a larger number of prints had been operated on. The sel d'or process also seemed to leave the print uninjured; no commencing yellowness or bleaching of half-tones being visible after exposure to the moist air.

The present series of experiments has confirmed the observation made in a former paper, that some tints obtained in positive printing are more permanent than others. The violet tones produced by sulphur soon pass into brown by the action of moisture, and even when gold is used, these purple colors are apt to become more or less reddened by the damp air. This is especially the case when English papers are used or caseine is added to the salting bath. Chocolate-brown tints which withstand boiling water (especially those upon ammonio-nitrate paper are at least affected by damp air; and indeed it is evident that the *long-continued* action of moist air has an effect similar to

* The glass bottles were new and had never before been used; they were well rinsed with distilled water, which was afterwards tested and found to contain nothing. It is therefore certain that the positives have been fairly tested, and that no accidental impurities were present.

that of boiling water in tending to redden the print, since I notice invariably that the tints which stand the hot water are unaffected by the moisture, although the former test is the most severe, as far as mere change of color is concerned.

Secondly. *Deleterious matters left in the paper may promote fading by moist air.*—This was evidently seen in two experiments in which positives toned in an old gold bath and washed in cold water were divided into halves, one of which was treated with ammonia so as to extract the size. The result showed that the halves in which the size was allowed to remain *faded*, whilst the others were scarcely injured.

The removal of the size also prevents the formation of mouldy spots, which will be seen more or less upon all the prints, excepting those which had been washed in hot water, or treated with an alkali.

The albumen proofs, washed only in cold water, were rendered perfectly useless by this accumulation of mould. When boiling water was used, no mould occurred; but even in this case there seemed to have been, on some of the prints, a little *putrefactive decomposition* of the albumen, which destroyed the gloss in isolated patches, but affected the image less than might have been anticipated. When caseine was used in place of albumen, the result was also less satisfactory than with plain papers prepared without caseine; and it seems evident that these animal substances, although stable under ordinary conditions, will, even when coagulated by nitrate of silver, undergo decomposition if kept long in a moist state.

The use of improper substances for mounting is also proved to be a cause of fading by oxidation; and the observations in the first report of the Printing Committee are confirmed. Acids of all kinds, and *acid salts*, will slowly but surely destroy the image. Hence *alum* used in sizing should not be permitted to remain in the paper; paste and starch, both fomenting substances and susceptible of conversion into acetic and lactic acids, are contra-indicated. If we allow that the half-tones of the picture contain a suboxide of silver, the folly of leaving anything in the paper which may generate an acid becomes manifest; the acid when formed, unites with the oxide and the picture is destroyed.

Effect of coating the paper with wax, &c.—From the experience gained in these experiments, I infer that when a print is prepared in such a way as to fade on exposure to damp, it cannot be protected by the application of a solution of wax to the surface. I found that the prints which had been waxed appeared to fade quite as much as, and in some cases more than, others which were left untouched. Waxing will not therefore be a remedy for the adoption of a bad mode of printing; and I think we must be careful lest, in attempting to protect the photograph from the air, we introduce substances which are hurtful. White wax is an article much adultrated, and turpentine, commonly used as the solvent, is liable to contain a principle possessing *oxidizing* properties, as may be shown by agitating commercial oil of turpentine with dilute solution of sulphate of indigo, the blue color of which it often quickly bleaches. If a coating is required to protect prints from the air, it may be applied in the form of a dilute spirit varnish, the picture having been previously re-sized with pure gelatine; this plan appeared to me to afford some protection.

The supposed accelerating influence of light upon the fading of positive prints is negatived by these experiments, as far as they extend. Many of the bottles containing the photographs were placed outside the window of a house with a southern aspect during the whole of the time, excepting two or three weeks, but no difference whatever could be detected between these prints and others kept in darkness. It will be satisfactory, however, that this part of the investigation should be repeated, allowing a longer time.

Exposure to damp air will afford a ready means by which the photographer may estimate the permanence of his proofs. They should be enclosed in a glass bottle with pure water at the bottom; if at the end of three months the color is unchanged, the lightest shades perfect, and the paper free from mouldiness, the mode of printing adopted is satisfactory.

Recapitulating the precautions suggested by these experiments, they may be condensed as follows:—Avoid sulphuretting the positives in the process of toning, and cleanse the proof from everything but the vegetable fibre. The print will then in all probability be permanent, as far as intrinsic causes of fading are concerned.

In conclusion I may remark, that the investigation which I undertook at your request and which it is my intention to close with this paper, has convinced me that the fading of photographic prints does not depend upon any inherent instability fo the image, but that it is due to injurious conditions, which I trust have now been ascertained, and if so, may easily be removed.

Mr. Shadbolt.—I cannot allow the occasion to pass without offering my testimony to the great diligence and skill which Mr. Hardwich has brought to bear on these experiments, the results of which he has laid before us. I regret very much I was not present at the last meeting, because he then gave the results of his investigation into the nature of the deposit upon the print. I can only say, that upon reading his paper I experienced the greatest possible amount of satisfaction. I consider it one of the points we shall have to be most proud of, when we come to sum up our doings for the Session.

The Chairman.—If no other gentleman has anything to remark upon this subject, perhaps I may be allowed to trespass upon the Meeting with a few remarks, not in connexion with this subject, but which have more especial reference to what occurred on a former occasion, when I was unfortunately not present. It is rather to explain what I expect is an error in the report of the proceedings. On reading the Journal, I find that Mr. Malone opened the discussion by regretting the absence of Dr. Percy, and continued.—" At the last meeting I rose in consequence of a remark of Mr. Hunt's, which contained a sweeping condemnation of all that has hitherto been done by photogrophers as regards the manipulation of the positive process." Now certainly Mr. Hunt never made any such sweeping condemnation. I think that Mr. Malone will allow that that does not exactly represent what was said on the occasion.

I then distinctly stated my opinion, which is no new one, but which I still hold, and which has been formed by sixteen years' practice in photography,—that a photograph, if properly prepared and fairly exposed, need not *necessarily* fade. I then also stated, what I venture to state again, that in 1841 and 1842 I prepared photographs, fixing them by the process recommended by Sir John Hershel; that those photographs have been exposed with a great deal of carelessness, under all circumstances, in a damp atmosphere, in the immediate neighborhood of the sea at Falmouth, and also in the metropolis, and although certainly poor compared with those we now produce, yet they are as good as they were when they were first produced.

With regard to fading of these photographs, we find, from all Mr. Hardwhich's experiments, that those fade with the greatest rapidity which have undergone the process called toning. Now the point upon which I remarked on a former occasion, and upon which I would again remark, is this, that a photograph, consisting, as Mr. Hardwhich has shown, of a metallic silver in combination with organic matter, as he thinks, but as I think of metallic silver only, the organic matter playing only an accidental part, yet that, like silver, there is not necessarily anything there which should change in any way, any more than the carbon of a print should change upon the white paper on which it is placed. By fixing in the usual way, that is, soaking the positive print in two or three or more baths of water, there is a fear that you may still leave some adhering hyposulphite of soda or hyposulphite of silver on the picture. You will find in nearly all the pictures that have faded, that the fading commences on one side; and I believe, in nearly all cases, if you examine into the fact, you will find that the side of the picture where the fading commenced was the lower side, when hung up to dry. There is an accumulation of perhaps infinitesimally small quantities of hyposulphite of silver, and that has gone on, under the influence of damp air, gradually eating its way over the picture, and eventually destroying it. But if, abandoning the process of simply soaking, we adopt that re-

commended by Sir John Hershel, of using a very strong solution of hydosulphite of soda, so that the whole of the unchanged chloride shall be removed from the paper; then the hyposulphite of silver or hyposulphite of soda can be removed from the paper by allowing a stream of water gradually to flow over the photograph, and also by adopting the additional precaution of a dabbling motion by a sponge or soft cloth, or some mechanical action, to get rid of the peculiar fibre by which these salts are held with great tenacity; then we can produce prints which will last certainly as long as any water-color drawing can be expected to remain. It is undoubtedly a most unfortunate circumstance that we should be preparing such beautiful pictures as are now produced, and that we should look upon them as things which in a few years must entirely vanish before our eyes. Not that they need fade, but that the process of fixing is not sufficient, or otherwise it has been improperly performed. I know that Mr. Malone has told me, and he himself has stated in this room, that some of the pictures he has prepared have remained permanent and others have faded. Now I cannot but believe, that if we examine into the conditions under which some have faded, we shall find that some of this injurious hyposulphite of soda or hyposulphite of silver has remained and done all the mischief.

In connexion with toning, I am perfectly satisfied that photographers would gain great advantage by turning their attention to salts of baryta. We use the salts of silver and the various compounds of sulphur for giving pleasing tints to our pictures, and in doing this, we are nearly in all cases introducing an injurious element into our prints. I am, however, satisfied from a series of experiments tried some years ago by myself, which were not published, but to which special allusion has been made, with quotations from some letters I wrote to Sir John Herschel upon the peculiar coloric actions of salts of baryta, —I am satisfied that by introducing into our positive prints salts of baryta in various proportions, we may produce even more tints than by any of the so-called processes of toning.

Mr. Malone.—We differ so radically, but I trust so amicably, that I have nothing to retract from the statement I made on a former occasion. Mr. Hunt thinks a photograph fixed with hyposulphite of soda, thoroughly cleansed with water, is as permanent as the carbon of an ordinary engraving. Hearing, as I do, the opinion that we have sulphuretted hydrogen in our atmosphere, that we have under certain circumstances quantities of ammonia and sulphuretted ammonia, and under othes circumstances sulphurous acid and eventually sulphuric acid,—having all these conditions to deal with in the atmosphere, I hold that the conditions are not the same: carbon is not destroyed by these agents in the manner that metallic silver may be. It is perfectly true that untoned prints do not fade at the rate at which toned prints fade; this occurs from our atmosphere; an untoned print becomes toned by process of time, and eventually it fades, and we shall not escape the difficulty by omitting the toning process. Then this would appear to be the case: if there is no necessity for photographs fading if they are properly washed, since a great many do fade, we must by fair inference condemn the photographers for the washing of those pictures; and that is a sweeping condemnation. This image of silver, if you admit it to be metallic silver, is attacked by sulphur. We know, as a fact, that the image is attacked by sulphide of ammonium: now there is some doubt whether pure metallic silver can be destroyed by it. I have refrained from expressing any opinion upon the nature of the image; but Mr. Hardwich has done us good service in the matter. I do not throw the slightest doubt upon his researches, yet I do not think that he has pointed out the exact constitution of the image. This is perhaps beside the the question; but I cannot say, from any experiments which have been made, that a photographic print is as durable as the carbon of an engraving upon paper.

Mr. Mayall.—Agreeing as I do, in a great measure, with the chemistry Mr. Hardwhich advances on this subject, I must yet compliment Mr. Malone for the few remarks he made at a meeting in May or June of last year, on the use of potash in order to remove any excess of acid that might be contained in the print. I am quite certain that few photographers do wash their prints sufficiently.

I also think, with Mr. Hunt, that we have been remiss in not having paid much more attention to the salts of baryta and to the chloride of barium; because if the paper be thus prepared—I am aware it cannot be altogether done with French paper—you may get a print without toning at all.

Hearing as I have done for some time, that the whole subject of bleaching of positives had received much attention, I have made some experiments as to getting an entirely new substance, whereby we can ignore the present paper on which we print, and I beg to submit to you a specimen of it. I have tried a series of experiments during the winter, as to combining a series of substances together to form a texture that could be made a substitute for paper. Amongst others, I conceived the barites finely powdered and washed, worked together with albumen, and rolled out into a paste, would form a substance as fine in texture as the French paper, upon which we could print without the intervention of the toning bath, because, barytes itself acts as a toning bath. As you see, the tone on the specimen exhibited is not at all objectionable; and it has this great advantage, that it has been fixed in the bath of the saturated hyposulphite of soda, after which a soft brush was passed over it three or four times, and that was quite sufficient to fix it. It then stood for a few moments in the open air, and was next plunged into water, letting no water dash on it. After washing it thus carefully, and after the image was finished and ready for drying, I put it into a very weak solution of sulphuric acid, which immediately converts the wet portion of the print into sulphate of baryta, and makes it almost indestructible by any of the ordinary agents to which photographic images are at present subjected. Then in order to coagulate the albumen, I plunged it into hot water for a second or two, and that prevents the organic decomposition of the albumen by moisture.

There is another branch of the subject on which I am now engaged. I have a weak solution of barytes and albumen made very thin in a bath, something like the ordinary nitrate of silver bath; into this I let a piece of French paper pass very slowly, and then draw it up very slowly, so as to leave no rills or gutters on the paper: I think I shall be enabled to coat a sheet of paper with a coating of barytes and albumen, so that you may print, not upon the paper, but upon this thin layer. This [exhibiting it] is perhaps the most successful I have yet made. I have tried alumina with gelatine in the same way, and that is a combination I should like to submit to Mr. Hardwhich. This I throw out as a suggestion. Hydrofluorsilic acid is one of the most invalluble substances that can possibly be made use of, to spread upon the surface of the paper with albumen or gelatine, or such other substance as will hold it together, so that I hope we shall be enabled to get a substance that will at once remove the great objection to the organic matter of the paper. If any gentleman would try this, I advise the use of 3 grains of chloride of barium to the ounce of distilled water, and with Turner's paper you can get unquestionably a finer-toned picture than by any other method I have seen, simply fixing it in the usual way by the hposulphite bath.

If these observations are not to the point, I am sorry I have taken up so much time, but I could not allow the Meeting to close without showing that there are other substances we can use instead of paper. One print I did last June, now in the hands of a distinguished lady, was fixed, washed, and finished in about one hour and a half, and that print up to the present time has not changed; and I maintain that it cannot change.

Mr. Hardwich.—I think we ought not to lose sight of the fact, that, as practical photographers, we have to ascertain, not so much whether the image consists of metallic silver or oxide of silver—although these points are interesting scientifically—as the *properties* of the image, and by what agents it is injured. It will, I think, be allowed by all, that I have shown that the photographic image is injured by a variety of causes which have never been stated to produce any injury upon metallic silver. If we find that a little sour paste is quite sufficient to injure the

picture, it is no satisfaction to us to be told that it consists of metallic silver, one of the most indestructible of metals.

Mr. Henneman.—We all know the "Pencil of Nature" alluded to by Mr. Malone; of those prints I made twenty-five in one batch; they had only three washings. Some of them remained perfectly good, as if they were printed but yesterday, and others have totally failed I should like Mr. Hardwich to consider that with regard to the observation he has just made about the paste: they were all treated in the same way, they were all bound into one hook, and yet some remain perfectly good for a dozen years, and others totally fade; I should like also to know whether Mr. Hardwich thinks the quality of the paper has anything to do with it.

Mr. Hardwich.—I think much may depend upon the character of the size, and therefore it is important that the whole or the greater part of the size should he got out before mounting the print. This is not difficult: a little hot water does it perfectly; but some object to hot water, because it has a tendency to redden the print. Mr. Malone has proposed potash, which answers perfectly, but it is very disagreeable to use. Common washing soda is quite as effectual for removing the size, and does not injure the color of the print. I think if this point had heen attended to from the commencement of photography we should have heard less of fading.

Mr. Malone.—Mr. Hardwich has alluded to the use of potash which I recommended some time since: I do not attempt to explain its action. It occurred to me obviously enough that it would remove the size and leave nothing but the fibre of the paper, and the image itself would be in a better condition to be preserved. It is quite true that potash is a disagreeable agent to use, but I carried my experiments beyond potash; I find caustic soda is much more simple, or caustic haryta. I would advise that experiments should be made with baryta in place of caustic potash. Those pictures obtained with potash were often destroyed by time, therefore it is not sufficient simply to remove from the print all but the fibre and the image. I do not think the analogy is perfect between the daguerreotype plate experimented on by Mr. Hardwich and the photographic print. We cannot suppose that we have anything in the daguerreotype plate other than sulphide of silver. Now I have already admitted that we have no chemical proof that sulphide of silver will fade or change in the atmosphere. I think there is a possibility of an action taking place arising from the oxidation of sulphuret of ammonium into hyposulphite of ammonia, which would attack the print but not the metal plate. I guarded myself strictly against being supposed to speak of sulphuretted hydrogen alone: I spoke more especially of sulphuretted hydrogen in combination with ammonia.

Mr. Hardwich.—It strikes me that in the experiments which Mr. Malone made, where carefully washed prints faded by exposure to air, we have no very certain knowledge of how they were prepared. How were those pictures toned? If Mr. Malone's prints were sulphuretted in fixing, it is easy to understand why they should fade.

Mr. Malone.—I spoke of a print simply fixed in hyposulphite, but afterwards toned, I think, by the atmosphere.

Mr Hardwich.—The experiments of Mr. Malone lose their value, if he cannot certify positively that his prints were not toned during the process of fixing.

Mr. Malone.—My impression is that they were not toned in fixing, hut were afterwards first toned and then faded by the action of the air.

The Chairman:—There is one remark I should like to make before closing the subject this evening, which is this, that Mr. Fox Talbot, when he first brought before the public his photographic process, did not use hyposulphite of soda as a fixing agent: he then employed either a solution of common salt or bromide of potassium. I am able to say, that having a number of pictures in my possession so prepared by Mr. Fox Talbot, under circumstances of ordinary exposure to the atmosphere they have undergone no change heyond that which took place a few weeks after their preparation. These pictures, so fixed, turn a little blue up to a certain point. I am satified from my experience, and from experiments I first made, that when a picture is fixed with ammonia, and then that ammonia is washed off, there is not the slightest indication of fading. Now all this convinces me that it is something remaining on the surface of the paper we have not removed that is the cause of the fading. It is not the action of sulphuretted hydrogen or sulphur of ammonia which may be existing in the atmosphere. We shall have an opportunity at another meeting of calling attention to the photographic image, and on that occasion I will bring some of these pictures, some very good, some very bad, in illustration of the points which I have now mentioned.

Gentlemen, I hope you will allow me to express, as I do most sincerely on behalf of myself, and in the name of the meeting, our thanks to Mr. Hardwich for the paper he has brought before us on the present occasion; and since this society was established for the purpose of carrying out scientific investigations with this most beautiful art, I hope this will continue to be the main object.

We are all deeply indebted to Mr. Hardwich for his communications; therefore, in your name, I would express our thanks to him for the papers he has laid before us.

For the Photographic and Fine Art Journal.

NOTES

On the Production of Life-Size Photographs of any Dimensions.*

BY A PRACTICAL PHOTOGRAPHER.

CHAPTER II.

MATERIALS, CHEMICALS AND FORMULAS.

1. *The Board*—To be used for exciting the iodized paper upon, and for developing, ought to be about half an inch smaller than the paper, so that the latter when laid upon it will overlap and prevent the solution or brush from soiling the board. The paper has to be fastened at the upper right-hand corner to the board, with one of the black pins, or (what I consider as much hetter and more handy) with one of the wooden patent clothes-pins, to use which it is only necessary to glue (not nail) a strip of pasteboard to the upper edge of the board, (as shown in fig. 3,) making it overlap one inch, when it will be found easy to apply the wooden clip.

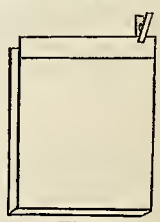


Fig. 3.

2. *Tablets.*—But for fastening the excited paper to the tablet the black pins will have to be used, and for this purpose the tablet ought to be made of such material as will allow the pins to be struck in with facility, without making them bend or tear the paper. I would recommend a light pine board covered with a piece of thick felt.

3. *Tumblers.*—Two small glass tumblers, perfectly smooth inside and outside, so as to he easily cleaned; one for the exciting and one for the developing solution.

4. *Brushes.*—Cotton or "Buckler's" brushes. To make these get a piece of glass tube, of half an inch or more diameter, and cut it up by means of a file into pieces from 3 to 4 inches long; these are to serve as brush handles and have to he well cleaned every time a new brush is made. Take a bunch of clean carded cotton, pass a string around, and with it pull it half into the glass tube; after taking off all the loose cotton and pulling out the string, the brush will be ready for use (see fig. 4.)

Fig. 4.

5. *Bottles.*—One four ounce bottle for aceto-nitrate of silver solution, and one six or eight ounce bottle for gallic acid solution. One bottle for distilled water, and a two ounce measure divided into drachms.

6. *Pins.* A box with black, japanned or laquered pins, to prevent all contact between the metal and the silver solution.

* Continued from page 119.

7. *Lamp.* A small lamp, the best is a burning-fluid lamp with a slide, for regulating the amount of light.

8. *Paper.* The selection of the *paper* is not half so important in this process, as it is for negatives or for the ordinary printing processes. Almost any kind of paper can be made to answer, provided it has sizing and body euough to bear the repeated washings and necessary handling.

I recommend Whatman's drawing papers of all sizes, and the roll paper sold by stationers under the uame of German-cartoon paper. With the latter, one has the advantage of being able to cut it into any required size with little or no waste, and of bringing out the picture in half the time required for the English papers. Still, I would advise the beginner to use Whatman's, at first on account of its being less sensitive, it is worked with greater ease and failures are less likely to occur from overtiming. The French papers. as Canson-frères thick positive, work very well too and are very sensitive, but they are much less easy to manage as to immersiug, etc.

CHEMICALS.

To operate sncecssfully, these ought to be perfectly pure.

1. *Crystallized nitrate of silver.*—It should be free from the smell of nitric acid, and the cork in the bottle show no traces of beiug attacked by nitric acid fumes, as is too often the case with Power's & Weightman's

2. *Iodide of Potassium.*—The crystals should be large, white and perfectly dry.

3. *Gallic acid,* crystallized, should be white.

4. *Glacial acetic acid.*—To be able to depend on the strength and purity of this substance is of the greatest importance. (I recommend with pleasure the crystallizable acetic acid sold by Mr. E. Anthony in New York, as it is the purest I have ever used, giving not the slightest precipitate with nitrate of silver). Nearly all the acetic acid, glacial or not, sold by druggists, forms a precipitate on being mixed with the silver solution, which of course reduces the quantity of silver in the solution and makes its strength altogether uncertain. To those who can not procure the crystallized acid, I recommend the useful little instrument called the actino-hydrometer, introduced by Mr. Ross, and sold by Tagliabue, New York (full instructions for its use, will be found accompanying it).

FORMULAS FOR THE SOLUTIONS.

1. *The iodizing solution.*—To make three ounces of iodizing solution, take the following quantities (for more, in proportion): Dissolve 50 grains of nitrate of silver in two ounces of distilled water, then add the same quantity of crystals of ioiide of potassium, stir up until all is dissolved. Wash the precipitate three or four times, then after pouring off all the water, redissolve the precipitate with iodide of potassium, adding water and iodide of potassium until you have *three* ounces of clear solution; being very careful to avoid an excess of iodide of potassium. This is very easily done by not making the solution perfectly clear, but leaving the slightest possible turbidness, which can then be got rid of by filtration.

Now take a perfectly dry and clean bottle, into which put ten grains of finely powdered gum tragicanth, and then filter the solntion into it. When filtered, cork the bottle and shake it up until the gum is all dissolved. It will have to stand and settle for at least twenty-four hours before being fit for use: I recommend to prepare a few ounces of iodizing solution and add to it a small quantity of the gum, so as to give it sufficient time to dissolve, when it will form a thick mucilage, which will be more convenient for mixing with the iodizing solution when wanted. In this way, it will be easy to make it just of the proper thickness (as it should be like oil), and then it can be nsed immediately after being mixed.

2. *Aceto-Nitrate of Silver.*—Dissolve 2 drachms of crystallized nitrate of silver in 2 ounces of distilled water, after which add 5 fl. drachms of glacial acetic acid. Let this stand for half an hour and then add two more ounces of distilled water. Shonld the acetic acid not be crystallized, then its strength will have to be ascertained by the means already noticed, and the deficiency made up by a larger amonnt of acid and less distilled water. It is better not to mix more than 4 oz. of aceto-nitrate at a time, as it generally seems to work better when fresh made. The solutions have to be filtered before nse.

3. *Gallic Acid Solution.*—Put half an ounce of gallic acid into a six or eight ounce bottle, and then fill it np to the cork with distilled water, after repeated shakings allow it to settle, when the clear liquid will be found sufficiently satnrated with gallic acid. When a days work is done, refill the bottle to the cork with water, shake it up well and set it away for another days use. Always keep an excess of crystals of gallic acid in the bottle. If left in the dark it will keep a very long time without getting decomposed or discolored; if the latter should happen it has to be thrown away. Keep solntious 2 and 3 on the shelf in the dark room.

4. Fill a bath of sufficient size, with hyposulphite of soda solution, made of the strength of 1 lb. of hypos. to the gallon of water. This will require filtering from time to time.

To be Continued. p. 253

From the Jour. of the Phot. Soc.

ON THE FADING OF WATER COLORS.

To the Editor of the Photographic Journal:

SIR,—I have been led into the following reflections in consequence of what occurred at the last monthly meeting respecting the fading of water-colors.

Mr. Harding considered it proper to animadvert upon some observations made by Mr. Fenton at the previons meeting on this subject; and although I am quite snre that it was far from Mr. Fenton's intention to depreciate so important a branch of the fine arts, for the purpose of exalting photography, yet, if the subject had not been noticed by a gentleman who was so well qualified to speak with authority, a very wrong and injurious impression would have been conveyed with respect to the permanency of water-colors. This being a snbject with which I have been professionally connected for the last fifty years, it was not likely that I should let the snbject drop without adding a few observations in pursuance of the correct statement made by Mr. Hardiug; and, as I see that a very inadequate report appears in the last Journal, I consider it necessary to endeavor to supply the deficiency.

First, let me briefly remark, that, considering the snbject under discussion at the previons meeting, I own that I do not see what the *fading of water-colors* had to do with the fading of *photographic works*, they being totally distinct, and having nothing in common with each other, either in the mode of operation or the materials employed, and therefore there can be uo comparison between the two, *even by way of illustration;* neither can I see what benefit it would be to photography to investigate the dnrability of water-colors. It is indeed an interesting inquiry, and oue which all artists have pursued, and it is a subject which has occupied much of my attention for a long series of years, more especially becanse my professional practice has been principally the employment of water-colors; I think therefore that I may be allowed to speak with some degree of certainty as to their durability, and that they do not fade of *necessity;* indeed they are quite as permanent as oil-colors; it does not depend at all upon the *vehicle*, but *the colors made use of.*

I have frequently tested a great variety of colors by exposing them to to the sun and light for six months at a time, so that I am well aware what colors do fade (and this is known to all artists and color-makers); consequently I avoid all such as are not of a permanent character. I repeat, therefore, that water-color paintings do not fade if the above precaution is fully adhered to. Indeed, *very few* colors are required by those who understand the principles of coloring, and therefore a judicious selection of the three *primary colors* (red, blue, and yellow,) is qnite sufficient to produce auy variety of tint, by a due and proper combination; and pictures so produced are generally of a more agreeable and harmonious character.

This is not, however, the place to enter very fully into the nature of colors or the mode of applying them; my object has been to assist in doing away with any wrong impressiou which may have been formed as to the durability of water-eolors, and considering the long practical experience I have had, I feel it to be a *duty* to endeavor to place the subject in its due and proper light. W. J. NEWTON.

P.S.—It was my intention to have read the foregoing at the last monthly meeting, but as other matter was introduced which occupied much time, it appeared to me desirable to send it to the Journal instead.

RESEARCHES ON THE METHODS
Of Preserving the Sensitiveness of Collodion Plates.

BY JOHN SPILLER AND WILLIAM CROOKES.

It is now two years since we had the honor of presenting to the photographic world our first experiments made with the view of preserving the sensitiveness of collodion plates. Iu the "Philosophical Magazine" for May 1854 (an abstract appearing in the "Photographic Journal" of that month) we communicated the possibility of securing this end by taking advantage of the deliquescent nature of certain neutral salts, which, by retaining water iu the film, enabled us to prolong or defer the exposure of the sensitive plate for a length of time which was not practicable by the ordinary collodion process. For this purpose we proposed the use of the nitrates of zinc, manganese, lime or magnesia, and, as a type of a class of substances equally suitable in the organic kingdom, glycerine; sugar also had been tried, but with no good result. In consequence of public attention being again drawn to glycerine by the lecture recently delivered before the Society of Art, we think it but right to assert our claim of priority in suggesting the applicatiou of this body to the purpose under consideration. We quote from the article of May 1854:—"Glycerine at first scemed to promise very good results, but the principal difficulty was the necessary impurity of the commercial product, in consequence of its being obtained from the exhausted leys of the soap-boilers." Now, however, that an improved process of manufacture has been introduced at the works of Price's Patent Candle Company, where it is obtained as a bye-product in the decomposition of fatty matters by high-pressure steam, it became a point of interest to determine whether the purer article might not well serve the object in view. With this intentiou we procured a sample of Price's glycerine as soon as it became an article of commerce, and although the result of our experiments coincides to a certain extent with those of Mr. Pollock and others, we nevertheless think it worth while to specify the particular points of difference in manipulation, some of which will, we believe, materially facilitate the preparation of the plates in this way.

Our first care was to ascertain the action of glycerine upon an aqueous solution of nitrate of silver. For this purpose, a mixture was made and divided into two portions, one of which was exposed to a full southern aspect, and the other carefully protected from every gleam of light; after a few days a thin but distinct coating of metallic silver was found lining the interior of the glass vessel iu the light, while very slight, if any, evidence of reducing action was appreciable in that kept in the dark, even after the expiration of a month. Finding the action of light to exercise this influence, we determined to keep separately, as far as possible, these two necessary ingredients in the process. With regard to the degree of concentration of the glycerine, the sample made use of has a specific gravity of 1·23; this we have employed in its original state, and mixed with various proportions of water; we perceive no great difference in the results, but are inclined to prefer its employment with but little dilution with water.

The process we have been led to adopt is the following:—The glass plate, cleaned with especial care (by treatment, first, with a hot solution of common washing soda, and subsequently with strong nitric acid), is coated with iodide of ammonium collodion in the usual way, and made sensitive by immersion in the ordinary silver bath (30 grains of the nitrate to 1 ounce of water*, so that the plate may be left its full time without fear of dissolving the sensitive film); after remaining here three or four minutes, the excited plate is transferred to, and immersed for an equal time in, a washing bath of pure distilled water; or instead of this bath we have sometimes used a stream of water from the "syringe bottle," the object being to remove the great excess of free nitrate of silver from the sensitive film.

So prepared, the plate is ready to receive the glycerine treatment. For this purpose we require, beside Price's glycerine, spec. grav. 1·23, or thereabouts, a dilute solution of nitrate of silver (1 grain of nitrate and 30 minims of glacial acetic acid to the ounce of water, with a trace, less than a drop, of nitrie acid). When about to be used, an *intimate* mixture is made in the proportion of 3 parts by volume of glycerine to 1 of the silver solution, and poured on to the surface of the washed collodion plate, its action being assisted by transferring, some two or three times, to and from the measure-glass; after five minutes' contact the plate has to be well drained, and placed in a nearly vertical position on blotting-paper, to absorb the large excess of glycerine from its surface. It will then be in a fit state for receiving the impression in the camera, a process which may either be performed immediately or deferred for a period of at least twenty-one days, the longest trial to which we have as yet submitted the plates. In regard to sensitiveness, they will, if used immediately, be fouud very little inferior to plates prepared in the ordinary way; we have, however, detected evidence of slight deterioration in proportion to the length of time the exposure has been deferred. In cases where it is necessary to keep the plates ready excited through a protracted interval, we have devised a convenient plate-box to store them in, which may easily be made by replacing the wooden grooves in an ordinary plate-box by two corrugated sheets of gutta-percha, and laying a square of thiu caoutchouc at the bottom for the glasses to rest upon. Such a box will always require au outer covering to protect its contents from every gleam of light, the necessity for which precaution, as also that of excluding injurious gasses, such as ammonia and sulphuretted hydrogeu, will be sufficiently obvious without further comment.

Before proceeding to develope the latent image on the glycerine plate, it is only necessary to immerse it for two or three minutes in the 30-grain nitrate of silver bath, when the solution of pyrogallic acid or protosalt of iron may be applied as usual; the remaiuing part of the process, fixing, &c., being conducted in the ordinary manner.

The negative pictures resulting from this mode of treatment have not, in our hands, beeu found wanting either in intensity or iu gradation of tone; they are, in fact, fully equal to the results of the collodion process as usually practised.

If considered desirable, a bath of the mixture of glycerine and aceto-nitrate of silver may be employed, instead of the mode of application recommended above; in that case it will be necessary to protect the fluid from the light, so as to avoid the deposition of metallic silver; and on that account to make use of a covered *gutta-percha*† in preference to a *glass* bath for holding the solution. The remarkable purity of Price's glycerine, and its absolute freedom from chlorides and sulphates, render the plan of mixing ouly as required for use far more practicable than would otherwise have been the case had filtration been necessary. Any excess of the preservative fluid, remaining after the preparation of a certain number of the plates, should be kept

* This is readily effected by dissolving the total weight of nitrate of silver in one-fourth of the bulk of water to be ultimately employed; a grain or so of iodide of potassium dissolved in a little water is now added, to precipitate an equivalent amount of iodide of silver, with which the solution will be saturated on stirring; the remaining bulk of the water is then added. After allowing time for subsidence, the solution may be filtered without difficulty. The addition of a few drops of glacial acetic acid to a large bath is an improvement.

† A form of covered gutta-percha bath, particularly suitable for containing the glycerine solution, has been recently introduced. It is, when closed, perfectly impervious to light.

on stock (in a dark place); and may be again employed for the same purpose, after filtering and adding a little pure glycerine to counterbalance the accession of a small proportion of nitrate of silver from each successive plate.

In addition to the glycerine process, we have at intervals given some attention to the means of preserving collodion plates, and have succeeded in attaining that object by several other methods, as also in improving the processes already detailed in our former communications.

Bearing in mind the qualities requisite to fulfil in the best manner the functions of a preservative agent, it occurred to us, that it might be possible to find a body having in itself the power of rendering the collodion film sensitive to light, or at least of sustaining it in that condition, and at the same time possessing deliquescent properties; substances having these two characters combined are presented in the fluoride and silico-fluoride of silver. To put this supposition to the test of experiment, we prepared these compounds (by dissolving freshly precipitated carbonate of silver in hydrofluoric and hydrofluosilicic acids respectively), and used their solutions, in place of the ordinary nitrate of silver bath, for exciting the iodized collodion film. Plates so treated readily became coated with a layer of iodide of silver, which seemed to be equally sensitive to light, whether produced by this or the method commonly employed; they had also the power of retaining a moist surface; but, unfortunately for the present object, it was found that a strong solution of fluoride of silver, like that of the nitrate, has the property of dissolving off the precipitated iodide of silver, destroying it by forming the small holes so well known in the practice of the ordinary collodion process. Meeting with this result, we determined to try their application in a more dilute form, after exciting the plate in a preliminary nitrate of silver bath; but by this mode of treatment also we were unsuccessful, being unable to preserve the sensitiveness by a quantity which was insufficient to exercise a destructive influence on the film. This difficulty, added to that experienced in the preparation of the fluoride in a neutral condition, any excess of hydrofluoric acid being objectionable on account of its property of etching the glass, and, on the other hand, the slightest alkaline reaction rendering it extremely difficult to obtain clear pictures on development, deterred us from pursuing the subject further in this direction.

Compelled, therefore, to return to the principle originally adopted, viz. the use of nitrate of silver in conjunction with a deliquescent salt, sufficient in amount to prevent its crystallizing, or even concentrating beyond a certain limit upon the plate, our experiments were directed to the selection of the most suitable among the numerous deliquescent agents at our disposal.

A longer experience with the the nitrate of magnesia has demonstrated the difficulty of preparing this substance on a large scale, free from an impurity very inimical to its successful application by the old formula*,—the *nitrite* of magnesia; the presence of this latter, by giving rise to the formation in the film of the nitrite of silver—a body from its very nature liable to decomposition under so many and slight circumstances—must necessarily introduce a condition unfavorable to the ultimate result. To effect the conversion of the nitrite† into nitrate, and at the same time to neutralize the invariable alkalinity of the commercial substance, we prefer to employ nitric acid highly diluted, and added gradually to the magnesian salt, previously dissolved in water, until a very faintly acid reaction is communicated to blue litmus-paper; any decided excess of acid must be avoided, its presence being certainly antagonistic to a high state of sensitiveness. The proportions we have generally adopted are,—

Nitrate of Magnesia................ 4 ounces.
Nitric Acid........................quant. suf.
Nitrate of Silver..................12 grains.
Water..............................12 ounces.

The silver salt must be added after the neutralization has been performed, any precipitated chloride resulting from impurity being removed by filtration. Before use it should be ascertained that the solution really contains silver, by transferring a few drops of the clear fluid to a watch-glass, and mixing with common salt, when a milky turbidity, however slight, will indicate the presence of a sufficient amount of silver to sustain the sensitive condition of the plate.

The solution of nitrate of magnesia may, if preferred, be prepared by double decomposition between sulphate of magnesia and nitrate of baryta, mixing them in the proportion of their chemical equivalents, and filtering off the insoluble sulphate of baryta. The only advantage in practising this method is the certainty of obtaining a neutral solution when the pure crystallized salts have been employed; it will, however, be found impossible to exclude a slight excess of one or other of these salts; a small quantity of magnesia was left in the solution used in our experiments, but it did not appear to exert any injurious influence. A small proportion of nitrate of silver must as usual be added before use.

The double nitrate of magnesia and ammonia we have also employed with very good results. It was prepared by measuring out two equal volumes of diluted nitric acid, saturating the one with carbonate of mangnesia, and the other with carbonate of ammonia, and then mixing; the solution required the addition of a few drops of very weak nitric acid to render it neutral, and a small quantity of nitrate of silver.

Nitrate of manganese, prepared either by dissolving the precipitated carbonate in dilute nitric acid, or by double decomposition between equivalent quantities of crystallized sulphate of manganese (MnO, SO^3+4HO) and nitrate of baryta, gives, upon addition of a small proportion of nitrate of silver, a solution well fitted for use as a preservative agent. The color of the liquid is a pale rose-red. The nitrate of copper has also been tried for our purpose, but did not give promising results, the sensitiveness of the collodion film being greatly impaired by the highly acid nature of this salt.

Finally, we have employed with excellent results the nitrate of nickel, which however requires some care in its preparation. The method we have found most successful consists in dissolving the metal in the smallest possible quantity of nitric acid, and adding to the solution highly dilute aqueous ammonia, sufficient in amount to precipitate a small portion of the oxide of nickel; this being filtered off, the liquid will have an alkaline reaction; nitric acid is now added until nearly neutralized, and the last traces of alkalinity removed by acetic acid, a slight excess of which is an advantage. Nitrate of silver should now be introduced in the proportion of 2 per cent. of the nickel originally employed. The above mode of proceeding will obviously give rise to the production of a certain quantity of nitrate of ammonia; this however combines to form a double nitrate of nickel and ammonia, a salt possessing deliquescent properties, and apparently equally suitable for our purpose.

Of all the substances known to be applicable to the preservation of collodion plates, we believe that the use of glycerine will give less trouble to those unaccustomed to chemical manipulation, and will be generally preferred from the greater certainty of its results. We have nevertheless thought it worth while to record our experience in respect to the other agents severally enumerated, even where, as in the case of fluoride of silver, they have not led to successful results, believing that a statement of the conditions under which we have endeavored to employ them may save some trouble to future experimentalists in the same direction.

London, May 1, 1856.

Mr. Shadbolt.—I have a few observations to make, because I think Mr. Spiller has omitted one or two points in the application of glycerine that ought to be borne in mind. It is useless to go back to the introduction of glycerine, inasmuch as when it was in an impure state it failed with everybody.

* Jour. Phot. Soc., vol. ii. p. 6.

† The presence of nitrous acid is easily recognized by Dr. Price's test. It is applied by adding a mixture of very dilute hydrochloric acid, with a weak solution of iodide of potassium, and starch paste to the nitrate of magnesia dissolved in water; in the event of its containing *nitrite*, a blue color or precipitate will appear, according to the amount of this impurity that may be present.

Mr. Pollock suggested to me recently a mode of employing glycerine; I have carefully tried the experiment as directed by him, but I confess not very successfully. But in the course of those experiments there were some points which came before me that gave me the notion that glycerine ought to be the most perfect substance possible to make use of. Practically I have not been able to carry it out, I am sorry to say; still I believe it will be done. After trying the plates as Mr. Pollock suggested, and after succeeding to my satisfaction, I then determined to follow a plan of simply pouring over the plates, as I have already done with honey, a mixture of glycerine and water. With the first plate I so tried, I poured back a portion of the glycerine and water that I made use of into a measure and exposed it to the full light of a window; in a very short time it became perfectly blackened. The plate I used the second time; treating it precisely as I did before, to my astonishment did not blacken. I then tried the experiment again precisely in the same way, and the same results followed. The first time the glycerine was used it blackened on exposure to the light, but when once that blackening had taken place and the deposited matter had been filtered out, no after use of the glycerine would cause it to blacken on exposure to the light. I thought it worth while to carry the experiment further. I added 30 grains of solution of nitrate of silver to the glycerine that had been blackened, and exposed it to the full blaze of sunshine, and no further blackening took place. I thought I had one of the most beautiful agents possible: I found on exposure of the plates so prepared within half an hour or an hour after the preparation, that the result was extremely satisfactory; but on keeping them to the next day I found the whole plate was covered with a perfect film of silver. I have never been able to go beyond that; I never could get an impression that was more than a perfect film of deposited nitrate of silver.

Mr. Malone.—It may be well to point out this fact; Mr. Shadbolt says he thinks glycerine will be used successfully; Mr. Spiller and Mr. Crookes tell us they have used it successfully; perhaps I may be allowed to bear testimony that an image developed on the plates has been found, with glycerine as an agent, to answer.

Mr. Spiller.—There is just one point of difference with Mr. Shadbolt: he had not, I believe, an addition of sulphuric acid.

Mr. Shadbolt.—I did not try it.

Mr. Spiller.—That makes a little difference. We have succeeded, however, sometimes without the addition of sulphuric acid.

The Chairman.—If no gentleman has any remark to make, I would present, in the name of the Society, our thanks to Mr. Spiller for his interesting communication.

THE PHOTOGRAPHIC SOCIETY OF SCOTLAND.

Patron, H.R.H. Prince Albert.

President, Sir David Brewster.

Vice-Presidents: Horatio Ross; George Moir.—*Council:* James Black; John Cay; Cosmo Innes; T. B. Johnson; Thos. Keith; Professor Macdonald; James Ross; William Walker.—*Honorary Treasurer*, H. G. Watson.—*Honorary Secretary*, C. G. H. Kinnear.

The first monthly Meeting of the Photographic Society of Scotland was held on the evening of the 8th inst. in the rooms of the Antiquarian Society, George Street; the President, Sir David Brewster, in the Chair. After the minutes of the two preliminary meetings were read and approved of, it was announced that the number of Members at that day amounted to 75. Sir David Brewster then addressed the Society (see below), and afterwards Mr. Horatio Ross exhibited a large portable folding camera (made for him by Mr. Bell, of Potter-row), and also the portable tent which he is in the habit of using when working with collodion in the open air, and at a distance from a "dark room."

Address of Sir David Brewster.

In taking the Chair, Gentlemen, in which your kindness has placed me, I must congratulate you on your success in establishing a Society for promoting one of the most interesting and useful branches of modern science. Photography is pre-eminently a scientific art: it requires no peculiar genius in its cultivators. The painter and the sculptor must bring into the works those high gifts which qualify them for the practice of their divine art. There is no poetry in the pencil of the Sun. The photographer cannot separate what is beautiful from what is common. Owing to the imperfection of his instruments and his materials, and the impossibility of fixing many of the objects of his study, he must often fail in holding his "mirror up to Nature," but there is no process by which Nature can be improved. The pencil of the artist must be called in, as it has already been, to give perfection and color to the photograph.

The painter and the sculptor, on the contrary, have at their command all the resources of analysis and combination,—selecting what is beautiful, suppressing what is offensive, and idealising and fixing those forms of expression and of beauty which, even when they are perceived, memory often fails to perpetuate. Hence it is that photography, in place of being a rival, as was once imagined, is an auxiliary to art, giving it new powers and new fields of operation, and receiving from it, in return, the most valuable aid.

There are two defects in photography, of such peculiar importance that every cultivator of the art ought to exert himself to remove them. The *first* of these is the want of color in all pictures taken by the action of light; and the *second* is the fading, and occasional disappearance of the photographs themselves, either from the action of light or moisture, or of some other element in our atmosphere.

It can hardly be expected that the brilliant colors of natural bodies could be reproduced in the Talbotype; but as M. Becquerel of the Academy of Sciences has produced on Daguerreotype plates every color in the prismatic spectrum, we may still hope that the same effect may be obtained upon paper. These colors, however, are so transitory that M. Becquerel has not been able to fix them, and it is quite possible that after the difficulty of their production has been overcome, we may never be able to make them permanent.

The second defect in photography, the want of durability in its productions, is of a more serious kind. In a large collection which I have of Mr. Talbot's early pictures, some of the finest are nearly effaced, and others are gradually disappearing, though protected from light, and kept in a dry room. Suspecting that moisture might be one of the most active causes, I immersed a photograph in a cistern of water, and found, that in three months it was reduced to white paper without even the trace of a picture.

Mr. Thomas Sutton claims for positives taken by his new method, a degree of permanence which is not possessed by ordinary pictures. Time, however, can alone substantiate such a claim. In order to try one test I cut one of his pictures into *three* parts, and placed *one* part in a cistern of water, *another* in daylight, and the *third* in the dark; and though they have been thus exposed for three months, they have not suffered any change. But even if the deterioration of photographs cannot be effectually prevented, it may be possible to revive the decayed picture. Some insoluble element may remain, to which chemical agents may impart color; if I rightly recollect, there is an experiment recorded by Sir John Herschel, in which a photograph completely effaced by one chemical agent was perfectly restored by another.

From these causes it has become a matter of great importance to have some method of perpetuating the works of the photographer. The arts of engraving and lithography are, of course, at his command for this purpose, and have been very successfully employed; but they are subject to all the defects of reducing and copying, and never can reproduce those fine shades which give such perfection and roundness to photographic portraiture.

An engraving may represent the minutest details in an oil-painting, or in a piece of the most ornamental sculpture, but it fails in giving those minute parts of photographs which sometimes require a microscope to make them visible.

Under these circumstances it is very fortunate for the photographer that the very method which his art required has been very recently invented, and that his works may not only be rendered more extensively useful, but placed beyond the reach of decay. This new art, which has been called *Photo-Galvanography*, is the invention of a friend and correspondent of my own, Mr. Paul Pretsch, late Manager of the Imperial Printing Office at Vienna. With the aid of a few enterprising partners from Manchester, Preston and Bradford, he has established a Company who have secured the invention by patent, and are now working it at Holloway Place near London.

The following is the account of it sent to me by Mr. Pretsch: "The invention consists of a peculiar adaptation of photography in combination with the electrotype, resulting in the production of an engraved plate suitable for printing or ornamental purposes. The leading feature of the invention is the production from a photographic original of an engraved surface suitable for copper plate printing or other purposes. A new mode and style of engraving, producing a tint superior to mezzo-tint or aquatint, results from plates made from photographic originals. Every detail and touch of nature is faithfully reproduced. The color of photographs is sometimes liable to change, and in several copies from the same negative there is a want of uniformity in the shade of color. By the new process this uncertainty of color is obviated, inasmuch as the prints from the plate are taken with ink, and require only the attention of an ordinary printer to keep them of an uniform color.

"The rapidity with which plates can be produced is another remarkable feature of the invention. From three days to three weeks is sufficient for the production of engraved plates, some of which, such as those from photographic originals, the human hand could never engrave, or if imitated by ordinary engraving, would require weeks, months, or even years."

The only other point to which I wish to direct your attention, is the method of taking photographic portraits, either single or binocular, for the stereoscope. In the camera for taking buildings and landscapes, large lenses are not necessary; but they have been introduced for the purpose of taking portraits quickly when the light is faint, or when the sitter cannot sit steadily for a sufficient time. The effect of these large lenses is to give hideous representations of the sitter; and it is doubtless from this cause, principally, that photographic portraiture is so extremely defective, exaggerating every feature, and producing pictures which vary greatly with the camera, and the lens or lenses which belong to it. The only remedy for these evils is to use small lenses; and when the sensitiveness of the photographic process is increased, we may hope to work with lenses not larger than the pupil of the human eye.

When these views were first made public, several professional protographers denied their accuracy. They refused to believe that a photographic portrait was a combination of a hundred portraits of the sitter, taken from a hundred different points of sight in the object-glass; and in order to prove this, I requested Mr. Buckle, the celebrated photographer, to make an experiment with his own camera, which placed the fact beyond a doubt.

So incorrect are the views entertained on the subject of photographic portraiture, that Mr. Alfred Smee, Surgeon to the Bank of England, and a distinguished optical writer, has actually proposed it as a great improvement to make the camera move upon a conical roller through a certain angle while the portrait is being taken. This process, even if his lens were as small as the human pupil, obviously makes the portrait a combination of portraits taken from a series of different points of sight in the line of the camera's motion.

Before concluding these hurried remarks, I may notice the great stimulus which photography has received, and will yet receive, for the demand for binocular pictures for the stereoscope. The advancement of photography as an art must be promoted by the number of artists or amateurs constantly at work. So great is the demand for binocular pictures, that artists are employed in taking them in every part of the world. The Stereoscope Company in London have advertised upwards of a *thousand*, including *sixty* views in Rome, and all the most interesting portions of Pompeii and Herculaneum.

As these binocular views are magnified by the instrument, they require to be executed with singular accuracy, and as *two* photographs are taken of every scene, we have the double chance of having a fine picture. Although these pictures are small when seen by the unassisted eye, their apparent magnitude, when rightly taken, and placed in the instrument, is exactly the same as the original appeared to the photographer. Those who desire to have larger pictures can easily obtain them from the small binocular ones, which are generally so distinct that they may be magnified many times.

For these reasons I would recommend the photographer always to take binocular pictures. He has thus his choice of two negatives, and the means of giving them the relief which is so much prized in the stereoscope.

I regret, Gentlemen, that it has not been in my power to make any more important communication to you of a photographical nature than what is contained in these few hurried notices. If I have not sufficiently explained my view on the subject of taking portraits with large lenses, I shall be glad to give any additional explanations to the Meeting that may be required.

DUBLIN PHOTOGRAPHIC SOCIETY.

COUNCIL FOR 1856.

President, Sir J. J. Coghill, Bart.

Vice-Presidents: Gilbert Sanders, M.R.I.A.; Captain Henry, 4th Dragoon Guards.—*Honorary Secretary*, Thomas Grubb, M.R.I.A., 15 Leinster Square, Rathmines.—*Treasurer*, Samuel Bewley, Jun., 6 Dame Street.—John Aldridge, M.D., M.R.I.A.; William Allen; Lord Otho Fitzgerald; Cart. Hartley, 8th King's Regt.; M. A. Hayes, R.H.A.; Joseph Kirk, R.H.A.; W. C. Kyle, LL.D.; James Robinson; Frederick Sanders; H. T. Vickers.

NORWICH PHOTOGRAPHIC SOCIETY.

The usual Monthly Meeting of this Society was held on the 2nd instant in the Council Chamber, Dr. Ranking in the Chair, who, after the formal business of the meeting, gave a detailed account of the waxed-process he was in the habit of using. Some discussion on the various formulæ for waxed paper followed, Mr. Stewart strongly advocating the use of urea, which he considered as giving brighter and clearer negatives in less time than ordinary waxed paper.

Mr. Parr mentioned that he had been trying acetate of soda in the preparation of waxed paper, and had succeeded, with an ordinary lens and a small stop, in obtaining dense negatives in five minutes.

A full account of this process was promised for the next meeting.

Several excellent photographs were exhibited by Dr. Ranking, Mr. Howes, and Mr. Pulley.

Dr. Ranking and Mr. Howes were requested to try the different modes of preserving collodion plates in a sensitive condition and report thereon.

With a vote of thanks to the Chairman, the meeting separated.

SULPHATE OF IRON STAINS.

Many of your readers have, like myself, been doubtless annoyed and vexed in finding a good collodion picture spoiled by black stains and streaks at those parts where the sulphate of iron has been poured on in developing. I have discovered a means if not entirely to remove, yet partially to remedy the evil.

When the picture is *surface*-dry, pour on strong alcohol in

RUINS OF MR. ANTHONY'S FACTORY, AFTER THE FIRE, APRIL 28, 1856.

Negative by C. D. Fredericks.

the same manner as collodion. As it dries, the defects will gradually disappear, and many little details in the dark parts will be developed. On the whole, I am of opinion it will be found to improve the tone of the picture generally.

Whilst on the subject, I would remark that many collodion pictures are injured in not allowing sufficient time for them to become perfectly dry before varnishing. At least five hours should be given.

AN AMATEUR.

P. S. Has there ever been any mode discovered to tone collodion pictures?

From the Jour. of the Phot. Soc.

SPOTTING OF COLLODION PLATES.

To the Editor of the Photographic Journal:

SIR,—Being an amateur in photography, and not having time at my disposal to study the various processes, I have confined myself exclusively to the collodion one.

There is a circumstance connected with the spotting of collodion plates which I have noticed, though I have not seen it referred to in the 'Photographic Journal,' 'Hardwhich,' or any other work on the subject,—I allude to peculiar spots on collodion plates which appear after they are developed and fixed, and which may be compared to small splashes of mud intervening between the glass and the film—white by reflected light in positives, slightly opaque by transmitted light in negatives, the proofs being always spotted.

Experiments satisfied me that these spots were *under*, *not upon* the film, and I naturally concluded that the glasses had not been properly cleaned; I consequently determined to be more careful in this respect, and used tripoli, nitric acid, and ammonia with considerable force, first separately and then successively, but without effect, the spots invariably appearing as described.

The plates I had been experimenting upon were old ones, and had been frequently used; I then determined to try a new plate, which I washed and dried without any extra care, and the spots disappeared. Further trials convinced me that the surfaces of old glasses which have been some months in use, undergo some chemical change, or have substances associated with them either chemically or mechanically most injurious to photography, and defying all ordinary remedies for the evil.

Fluoric acid might possibly account for the appearance if fluorides were used, but I make my own collodion and iodize it with the iodides and bromides of potassium, ammonium, and cadmium only.

I mentioned this subject to a practical chemist in Dublin, who informed me that the Professor of Chemistry in one of the Queen's Colleges had made a similar remark to him, and that a professional photographer had told him he found it sometimes impossible to get rid of spots when using old glass plates.

This subject may be worthy of further inquiry, especially when it is to be observed that these spots, whatever be their composition, exhibit great sensitiveness to light.

I am, Sir, your obedient Servant,

W. M. MACARTNEY.

"TOUCHED-UP" OR "COLORED" PHOTOGRAPHS.

To the Editor of the Photographic Journal:

SIR,—I was exceedingly gratified on reading the letter of "A Photographer," under the above heading, in the Journal for this month, as it entirely agrees with the opinions I have always advocated. It appears to me to be only a matter of *simple justice* to those photographers, the greater part of whose time, talents, and in many cases means, are entirely devoted to the advancement and improvement of this enticing art, and to its practice in its simplicity and purity, that in any Exhibition countenanced by the Photographic Society their works should be allowed to stand upon their own intrinsic merits, and should not be subjected to a comparison with others, the greater part of the merit of which is due to the labour bestowed upon them by the disciples of a sister art.

The practice of "touching" (?*patching*) has now reached such a point, that one of the first questions asked on seeing a photograph is, "Now is this *really* the 'positive' result of photography?" and the look of incredulity with which a reply in the affirmative is met plainly tells its own tale. No doubt, in the case of a "touched" (?*patched*) photograph, the artist, when expostulated with, would reply that it rendered the appearance of the picture more *touching;* but the absence of *truth* to the lover of pure art can never compensate for such (*quasi*) sentiment. I quite agree with "A Photographer" in the opinion, that by "rejecting such pictures entirely, nothing will be lost to the public, and much will be gained by the art." The notices in the Catalogue are not a sufficient safeguard against the evil; by the casual visiter they are seldom observed, and it is taken for granted that everything exhibited is the result of photography; while by the critical observer "touching is found to be carried to such an extent, that he is compelled to take refuge in a tacit aquiescence in the practice, much as he must inwardly disapprove of it. I sincerely hope that those who live to see the next Annual Photographic Exhibition, will find the *strongest possible* prohibition placed upon the admission of anything bearing the slighest evidence of "*patching*' (I should of course have written "*touching*").

With respect to "colored" photographs, they might with equal justice be hung on the walls of any of our oil or water-color exhibitions, for comparison with the works of artists in those departments of art.

I beg to subscribe myself, &c.,

"*What I appear to be.*"

From La Lumiere.

FORMULA FOR THE PREPARATION OF NEGATIVE PAPER.

SIR:—Being satisfied that it is in the paper itself that photography is to find the agent most favorable to its development and perfection, an idea which is generally admitted, our efforts are directed towards such an improvement therein as shall be at once decided and desirable. Our fine extra prompt negative paper, which possesses the greatest possible purity, is compact and homogeneous, allowing the chemical substances to permeate its whole texture, unites in the highest degree all the conditions necessary to success, which in our hands, is still further ensured by the ulterior preparations of albumenized ioduration. We have received numerous eulogiums on our paper, but on the other hand, we acknowledge, though with deep regret, that some practicians have obtained with it but passable results.

We cannot attribute these failures to anything but a lack of precaution; to prevent them we give the following sensitizing solution, for the insertion of which, sir, in your valuable Journal, we shall be greatly indebted.

Pepare a bath of aceto-nitrate of silver, 7 grs. of nitrate of silver, and 10 grs. of acetic acid, to 100 grs. of distilled water. Float the sheet on the side opposite to that on which the word *euvers* is written, which side is the most glossy, let it lay about a minute, then by means of a quill sink it completely under, and withdraw in about five minutes; then wash and sponge it and leave it to dry between sheets of blotting paper.

One very important thing to be observed, is the non-employment of a bath which has become discolored with animal black. As this substance possesses the property of dissolving albumen, the discoloration should be removed with highly purified clay.*

The paper must be so exposed in the camera, that the most brilliant side shall receive the radiation of the light.

The duration of the pose should be proportionally very short. All other operations are performed in the usual way.

We send you a few sheets of the said paper, in order that you may make trial of them, and satisfy yourself as to their important qualities. Accept, sir, &c.,

A. MARION & CO.

* Mr. Hardwich in his Manual of Photographic Chemistry, recommends common pipe clay.—TRANS.

MELHUISH'S ROLLER SLIDE.

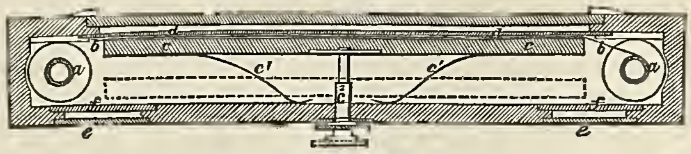


Fig. 1,—Plan in Section.

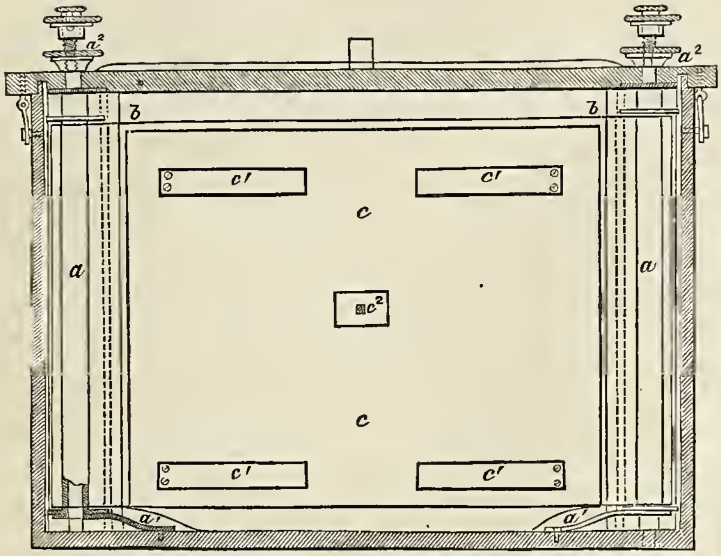


Fig. 2.—Longitudinal Section.

To the Editor of the Photographic Journal:

Sir,—The object of the slide is to enable a person to carry out any number of sheets of sensitive paper and change them conveniently in the open light. The slide is fitted up with two rollers *a a*, and the sensitive sheets *b b* are gummed together, making one long band, the ends of which are gummed to pieces of paper always kept on the rollers. The sensitive sheets are wound off the left or reserve roller on to the right or exposed roller, until all are exposed.

The rollers are supported on springs a^1 a^1, to render their motion equal; they are turned by the milled heads *m m*, and clamped when each fresh sheet is brought into position by the nuts a^2 a^2; *c* is a board which is pressed forward by springs *c' c'*, so as to hold the sheet to be exposed, and keep it smooth against the plate of glass *d*; when the sheet has been exposed, the board is drawn back from the glass in order to release the exposed sheet, and allow it to be rolled on the exposed roller: the board is kept back while this is being done by turning the square rod c^2 half round, so that the angles of the square will not pass back through the square opening until again turned opposite to it; *e e* are doors, by opening which the operator can see (through the yellow glass *y y*) to adjust the position of the sensitive sheets when changing them.

Observations,

The sheets need not be gummed together with *any particular care*, the pressure board insures their being kept flat whilst being exposed; all that is necessary is that the person joining them should have clean hands, and lay the sheets to be connected on clean paper. It takes about an hour to fix 36 sheets on the rollers. It takes *less than a minute* to change each sheet.

My test specimens at the Exhibition are taken with the roller slide. It has been used by James Glaisher, Esq., F. R. S., John South, Esq., of St. Thomas's Hospital, and Frank Haes, Esq., who have expressed themselves satisfied with its performance.

I remain, Sir,

Yours very respectfully,

A. J. Melhuish.

PROCESS FOR A HOT CLIMATE.

To the Editor of the Photographic Journal:

Sir,—In answer to "An Over-exposed Indian," I enclose a process (a modification of Stewart's) which is suitable to a hot climate. Being in South America during last year I had an opportunity of testing it, and the photographs turned out well.

Your correspondent complains of the yellow calico. I found this soon faded when exposed to a tropical sun, and substituted a kind of yellow baize, which is used by the blacks in Brazil for best jackets. No doubt it is exported to St. Vincent.

I am, Sir, yours obediently,

Edward A. Copland.

To produce a Negative.

1st. Obtain good old paper made by Turner (that of 1845 is the best); after having cut it to the form of the camera, saturate it in solution as follows, viz.—

50 grains of iodide of potassium in two ozs. distilled water and allow this to become partially dry.

2ndly. On a sheet of plate glass spread the following solution, viz.—

50 grains of nitrate of silver in 1 oz. distilled water and 60 min. acetic acid,

and carefully lay the prepared paper so as to absorb this solution evenly on *one* side only. This must de done in a dark room.

Place the paper in the camera frame and expose to the light for 10 minutes, after that time, close the frame, and in the dark develope the image with a hot saturated solution of gallic acid.

Wash with distilled water. Fix with hyposulphite solution, usual strength. Then thoroughly wash until the water is tasteless.

THE COLLODION PROCESS.*

BY THOMAS H. HENNAH.

EXPOSURE OF THE PLATE.

108. The plate after being rendered sensitive by the last operation is to be submitted to the action of light in the camera with as little delay as possible. The time of exposure necessary for obtaining perfect results varies so constantly with the intensity of light, the power of the lens, and the state of the collodion and the bath, that no rule applicable to all cases can be given; the operator must therefore now depend upon experience as his guide, for *it is only by the behavior of the film under the action of the developing solution, and the character of the picture after developing*, that he can judge if the exposure has been of the proper duration, and he should as soon as possible make himself acquainted with the appearance of the film both when over and under exposed, so as to be able at once to correct any error he may have been guilty of.

109. When a beginner, if a photographer wishes to produce photographs worthy of being called *pictures*, he should lose no opportunity of learning the causes of the variation in tone and finish observed in the work of different operators, and by finding out the sources of error as well as the means of success, enable himself to produce at will pictures of any character.

110. Difficult as this may at first sight appear, it is not so in reality, and no one should be satisfied until he can command the photographic part of his art. When he can, although he may take a higher position than is deserved by those who have to trust to chance for a picture, he has still much to do before he will gain the name of artist as well as photographer.

* Continued from page 187.

111. It is not sufficient to place an object opposite a camera, and regardless of any thing but fine focussing to receive, and, alas ! perhaps perpetuate what may be an enormity. Close attention must be paid—whether we are taking a portrait, or view, or copying a work of art, to the selection of a good point of sight, or arrangement of light, &c.; and instead of denying or concealing the fact of the distortion of all images of objects in relief when thrown by lenses upon a flat surface, we should always bear it in mind, and by employing lenses of long foci and moderate apertures, and by arranging our subject so as to be as much in one plane as possible, reduce the error to its lowest amount, in fact until it is practically scarcely to be called an error.

112. All this may be and is done by many photographers, and when to this is added au artist's skill in making the most of a subject by arrangement of light and accessories, and choosing the point of sight well, they may surely claim for themselves a better consideration than that to which the mechanical attempts and sorry productions of self-styled photographers had nearly consigned them.

DEVELOPING THE PICTURE.

113. For certainty and uniformity of action nothing has yet been found so generally applicable to this purpose as pyrogallic acid when properly used.

114. The developing solution for ordinary use should be made as follows:—

Pyrogallic Acid	1 grain.
Glacial Acetic Acid	5 minims.
Alcohol	10 minims.
Distilled water	1 ounce.

Mix and filter through bibulous paper.

115. This solution will, if kept long, acquire a brown color, particularly if in a hot place; it will, however, even iu summer, remain good for a week, or if made with distilled water that has been recently boiled and kept in a stoppered bottle, it will remain fit for use two or three weeks. A slight degree of color need not be regarded, still it is better not to mix too much at a time ou account of its being undoubtedly rather better if used fresh.

116. The plate, having been removed into the operating room (from which all white light must be excluded) in the camera frame, is to be placed quickly and carefully upon the levelling stand. * * * * * * A quantity* of the preceding solution having been measured into a clean glass, a solution of nitrate of silver (forty grains to the ounce of water) is to be added in the proportion of two drops to each dram. When these have been mixed by stirring with a clean glass rod, they are to be poured or almost thrown over the plate, taking care not to disturb the film by moving the hand, holding the measure in a circular manner so as to disperse the contents rapidly and evenly over the surface, which dispersion may be assisted by blowing upon the glass with the mouth; this not only has the effect of rendering the application equal, but serves to keep in suspension the deposit which generally forms, and which if allowed to settle in any one place would spot the picture. The operator should not blow too long in one place, nor with sufficient force to remove the fluid entirely from any part of the plate—cloudy dirty marks being often produced by so doing; another cause of unequal development is neglecting to mix the pyrogallic and silver solutions together with adequate care.

117. It will be observed that the preceding solution is spoken of as that for ordinary use, and for ordinary and almost universal use it is certainly the best the writer has tried. It may however happen, particularly when a new bath is in use, that it will not give intensity enough even when the collodiou and other solutions are iu good order. We must then (without exceeding three grains to the ounce (increase the quantity of pyrogallic acid by half a grain at a time until sufficient intensity is gained, at the same time adding a larger quantity of the silver solution.

* More or less according to the size of the plate.

118. If the wished-for intensity is not procured by the additional strength of the solution, some cause over which it has no influence must be at work, and must be sought for either in the bath, the collodion, or the *time of exposure.*

119. It frequently happens that, instead of a want, there is an excess of intensity; in this case the first step should be to reduce the quantity of, or even entirely omit, the silver solution. If this does not do, the strength of the pyrogallic solution must be diminished; but if neither of these remedies avail, longer exposure must be given. This last certainly prevents excessive intensity and hardness, and is perhaps more needed by the beginner than any other; the common error of allowing too short an exposure, giving rise to the condemnation of many really good collodions, and creating more disappointment than is generally supposed.

120. As soon as the fluid is applied to the glass, the operator should watch the progress of development with the utmost attention, for as before said it is upon a knowledge of the appearance presented by the film of collodion both when under and over exposed, that the beginner will have to depend for ascertaining the time for allowing the plate to be acted on by light.

121. He must from time to time, by holding a piece of white paper beneath the glass, and if practicable, by looking up through it, observe the amount of intensity he has obtained, taking the following remarks for his guide (until he has had experience) as to the time for arresting the action of the developing fluid.

122. If, upon pouring on the solution, the image appears tardily, and the high lights upon the portrait, &c., attain great intensity before the details of the dress are visible, and if after removing the iodide by the hyposulphite it exhibits a greyish appearance by reflected, and a perfectly opaque deposit in the high lights by transmitted light, *it has been under-exposed.*

123. If, on the contrary, the picture appears quickly, the shadows coming out nearly at the same time with the lighter part, and if after a time it begins to change all over, and, lastly, if upon removing the iodide no picture is visible by reflected, and only a faint one by transmitted light, *it has been over-exposed.* The great want of contrast in over-exposed pictures is worthy of remark, the folds of black and white drapery being even in the same picture scarcely distinguishable by their intensity from each other. It is commonly the case, when a weak solution of pyrogallic acid is used in developing, and the picture is over-exposed, that a beautifully ruby-red color will be observed on looking through it while wet, and it will be found that, although it appears but of slight intensity, it will yield very perfect positives, the red color becoming when dry a rich transparent brown, and by so changing admitting of greater delicacy of tone and definition than when the same amount of intensity is obtained from a more opaque deposit. On this account it is of more advantage to over than to under-expose, still, from these very terms of *over* and *under*, it will be inferred that there must be some intermediate time of exposure more advantageous than that which would produce either of the results just described.

124. If upon developing, first the lights and immediately afterwards the shadows of the face, followed by the dress of the sitter, make their appearance, the deep shadows under the arms, &c., preserving nearly their original clearness, while the lights go on increasing in power, and after using the hyposulphite* it exhibits a colored bloom of red and green upon its surface, the principal lines being clearly seen when it is looked down upon, and when looked through all the different parts of the picture are shown in their proper (reversed) gradation of power, a small amount of transparency remaining even in the highest lights, *it has had the right exposure.* Although the characteristics of a properly exposed negative are those given above, a considerable range of time may be allowed without producing an utterly useless picture; but the beginner must rememember that it is always better to give too much than too little.

* This is more particularly the case when nitrite of silver is used in the bath.

125. At the risk of repetition, a few useful hints on this subject may be given in conclusion.

126. If a plate has not been much under-exposed, a tolerable picture may often be obtained if the developing fluid is not allowed to remain on long enough to render the lights perfectly opaque.

127. An under-exposed picture is also frequently made useful by varnishing, its intensity being diminished by so doing, while, on the contrary, we should avoid varnishing a weak over-exposed picture for the same reason.

128. If a plate has been over-exposed, it is of very little use trying to increase the intensity of the picture by continuing the action of the developing fluid long after it has begun to blacken equally.

129. When properly exposed, the action may be continued until the whole of the details are clearly seen by transmitted light, taking care that the lights do not gain too much strength.

130. The operator must not confound the effects of over-exposure with those following upon the action of light upon the film, either from the frame not being well made, or from the room not being sufficiently darkened. They are very difficult to distinguish; in fact, so much so, that experiment is needed by most operators to ascertain to which they may attribute their failure. If the frame fits badly, the cloudiness will generally be partial, while if white light gains an entrance into the room it will be more equal, and will resemble more closely the effect of over-exposure. Light striking into the lens will also produce an appearance resembling over-exposure.

131. In most cases when over-exposed, the whole of the picture appears very quickly, and we see at first that it is the image itself which is developing *altogether* so fast; while if the cloudiness and weakness are owing to the action of extraneous light, the image will appear at first slowly, and then it will seem as if a general deposit took place over the whole surface, veiling the picture completely.

132. The beginner will also find difficulty in distinguishing the effect of an *alkaline bath* from that of over-exposure and from that just mentioned. But, as in the portion relating to the bath, he is cautioned against its use, and recommended to have it at all times slightly acid, time need not be wasted in describing what ought never to be met with.

133. When the development has proceeded far enough, the plate is to be removed from the stand and washed, by pouring a gentle stream of water upon its surface while it is held horizontally. This operation requires care; for if the water is poured from too great a height, or if the plate is too much inclined, the collodion will be torn from it; but if *common care* is exercised, this accident is not likely to happen.

FIXING THE IMAGE.

134. After washing, the plate is to be immersed in a solution made as follows:—

Hyposulphite of Soda	10 ounces.
Water	20 "

Sufficient of this solution is to be placed in a gutta-percha bath similar to that used in exciting; and after resting the plate on a dipper, it is to be plunged in, and allowed to remain until the whole of the iodide is dissolved.

135. The plate may be examined occasionally by lifting it out of the bath, and when it appears quite clean and free from veined markings, it is again to be thoroughly washed to remove every trace of the hyposulphite from it; for if from this being carelessly done any should remain, it will after a time crystallize and destroy the film.

136. It may here be observed that the above solution of hyposulphite will serve for many plates, and must only be renewed when it becomes so saturated with iodide as to require too long a time to complete its action.

137. This application renders the plate insensitive to the action of light, and quickly dissolves the yellow iodide; while doing so the negative pictures seem gradually to vanish, and then, if it has been well developed, to reappear as a positive. It is important that the action of the hyposulphite should be continued long enough to dissolve out the whole of the iodide, for if not completely removed at first, it will cause an otherwise good negative to be perfectly useless, the collodion seldom being able to bear a second application of the hyposulphite after it has once dried.

138. The picture, after being drained and then dried by holding it at a short distance from a fire or by placing it in a draught of air, is finished, and may be printed from immediately; it is better, however, when the ngative is of sufficient intensity to varnish it previously as a protection from injury.

139. In the event of the operator not being able to procure a supply of pyrogallic acid, he will find the protosulphate of iron a very useful substitute; it is, however, more difficult to obtain good pictures with it: the best method of using it is that proposed by Le Gray

Protosulphate of Iron	500 grains.
Sulphuric Acid	20 drops.
Acetic Acid	100 minims.
Distilled Water	10 ounces.

140. It should be placed in a glass or gutta-percha bath, and may be used for many negatives in succession until its reducing power is so far exhausted that it fails in developing the latent image. The muddy appearance it assumes may be disregarded, no ill effects resulting from it. The plate must be placed on a dipper as in exciting, and must be plunged quickly into the solution. In this there is no difficulty; but in watching the development, much care is required; for if the plate is kept too long out of the bath it will be covered with veined marking, which cannot be got rid of afterwards: it should be lifted out but for an instant, and if it is thought to be sufficiently developed, is to be immediately washed, either by immersion or by a stream of water. If, however, the image is not sufficiently brought out, it must be replaced in the bath until the desired intensity is obtained.

141. Some operators, to increase the intensity of the negatives produced by using the solution of protosulphate of iron, pour over the plate a weak solution of silver. This the writer has not tried; he cannot therefore state the necessary strength for the silver solution. In either case, after washing, the negative is to be fixed in the same manner as when pyrogallic is used, the protosulphate of iron recommended by Le Gray for fixing being most uncertain in its action.

142. It must be borne in mind that the iron solution is useful as a substitute, and as a substitute only, for the pyrogallic solution, except when instantaneous pictures are attempted; it may then perhaps be considered superior on account of its doing away with a great deal of the harshness observable in many instantaneous pictures developed with the pyrogallic acid.

143. Many kinds of varnish have been recommended, all of which possess some merit. The writer prefers those made with chloroform: the rapidity with which they dry preventing the annoyance caused by the settlement of particles of dust on those which dry more slowly, and the ease with which they are applied making them also additionally valuable to the beginner.

144. Whatever varnish is used the plate must be perfectly dry before its application, and the drying must not in any case be attempted to be hastened by blowing upon it with the mouth, the moisture of the breath causing an opacity of the film not at all desirable. All the varnishes may be applied to the glass in the same manner as when coating it with collodion, and the above remarks may serve as a caution for all.

145. Mastic varnish (picture varnish) is most frequently at hand, and should be diluted for use with twice its quantity of turpentine.

146. Spirit varnish requires rather different management than do the others. Before its application the plate must be held before a fire until it is as hot as the hand can bear; the varnish is then poured on and drained off again into the bottle, and the glass, particularly if thin, is again to be held before the fire for a few moments, to keep up the heat until the spirit has all evaporated; for when the plate is allowed to cool before the spirit

has left it, instead of a hard, bright, glossy surface, only a dull, rough one (similar to that produced by breathing on the chloroform varnish while soft) is obtained.

POSITIVE PICTURES ON GLASS.—AMBROTYPE.

147. In touching upon this branch of the subject the writer is obliged, in some measure, to depart from the course he had intended to pursue, namely, that of giving, instead of a compilation of the numberless methods, both good and bad, that have been suggested, only the one he had been led by experience to adopt; it being his opinion that the beginner at all events will be most benefitted by having his attention directed to one course, instead of being bewildered by half a dozen, even if that one should not be the best.

148. As a rule the bath for positives should be more acid than for negatives; it is not however necessary to alter a good bath or to make a new one if *many* positives are not wanted, the effect of an acid bath being easily produced by adding two or three drops of tincture of iodine to each ounce of collodion; by this means almost any collodion will be made to give tolerable positives; although not so good as when a weaker collodion is used, it having been found that for positives a two-grain iodizing solution acts much better than the usual four-grain solution; it is also better to use a rather thinner collodion. The exposure for positives is less than that required for negatives, and they can be obtained with an amount of light which, with any exposure, would be incapable of producing negatives.

149. The chief difference in the course to be pursued for obtaining positives and negatives lies, after exposing, in the development.

150. The method most nearly approaching that for negatives is that suggested in the early days of collodion by Mr. Horne, and is even now thought by many to be good. He merely adds to the ordinary pyrogallic developing solution a small quantity of nitric acid, a drop or even less to the ounce being sufficient; if the picture comes out greenish and wants depth and brilliancy too much acid has been added, if, on the contrary, it looks brown and dull more is required; it must however be remembered that the deposit always looks whiter when dry than when wet. On account of the necessity, in some cases, of using very small quantities of nitric acid, it should be kept diluted, so that a portion equal to no more than a fiftieth part of a drop of the strong acid may, when required, be added.

151. It will, with most kinds of collodion, be necessary to add to the developing solution some nitrate of silver, in the same proportion as recommended for negatives.

152. They may be fixed in the same manner as negatives, but more care must be taken to wash away all the developing solution before immersing the plate in the hypo, otherwise the acid contained in it will decompose the hyposulphite, and cause a blackening of the deposit, which, although not very injurious to negatives, would entirely spoil a positive. The cyanide fixing solution, given on the following page, is at present preferred by most operators to the hyposulphite; it certainly gives a whiter picture, although, in the opinion of the writer, not so rich a one.

153. The brilliancy and finish lost by drying when positives are obtained, either by this or any other means, are always restored by varnishing.

154. Far more brilliant, although to many not such pleasing, positives can easily be obtained by the following method:—Collodion rather thinner than usual is employed, and the plate is excited with the usual bath, and after exposing, not more than half the time that would be required for a negative, the image is brought out by immersing it in a bath made as follows:—

Protosulphate of Iron	40 grains.
Nitric Acid	2 drops.
Acetic Acid	30 minims.
Alcohol	20 minims.
Distilled Water	1 ounce.

The iron is to be dissolved in half the water, and when a solution is obtained, the nitric and acetic acids are to be diluted by mixing with the remainder, and are to be added to the iron solution; the alcohol may then be added.

155. No injurious effect arises from this solution becoming thick, as it does after being used two or three times; it is better however to filter it occasionally, and when not in use to preserve it from the air in a stoppered bottle.

156. In this, as in most other cases where positives are worked for, they may be fixed in the same manner as negatives.

157. The following method of M. Martin is much praised by French operators, and by many who have tried it here. Instead of the usual bath, one composed as follows is employed:—

Nitrate of Silver	40 grains
Nitric Acid	24 minims.
Distilled Water	1 ounce.

158. After exposure the plate is developed by immersion in a bath of sulphate of iron, which, instead of M. Martin's formula, had, the writer thinks, better be the same as that recommended in the preceding paragraph. When sufficiently developed he washes it thoroughly with water, and then immerses in another bath composed of—

Nitrate of Silver	12 grains.
Cyanide of Potassium	77 grains.
Distilled Water	7 ounces.

which will convert the negative picture into a positive of a whiter and better color than when hyposulphite is used.

159. It will often, in developing positives, be found that if sufficient exposure has not been given the picture developes slowly. When this is the case, instead of the blacks being pure and strong, a formation of small spangles of metallic silver takes place, after a time, over the whole picture, and of course spoils it. On the contrary, when over-exposed, the developing fluid acts so rapidly on the parts that have received most light, that it has to be poured off before the half tones appear; in this case the blacks will be very strong and clear, but all definition will be lost in the lighter parts.

160. The development must not be carried nearly so far as when bringing out negatives; it should be stopped before the details are visible in the darker parts, on account of the color of the deposit forming the picture approaching so nearly to that of the iodide already there, that until the unchanged portions are removed we cannot perceive all the detail in the shadows that may have been obtained.

161. Contrary to the fault of under-developing, so frequently committed when working for negatives, it is more frequently found that good positives are spoilt by going too far, and that if we had not been so anxious to see all, we should not have lost all, the effect of over-developing being to blend into one mass the light parts of the image to the extinction of most of the delicacy for which positives are prized. In concluding this branch of the subject, the writer would caution those following his directions that he does not by any means think himself qualified to say much on positives on glass, but little of his attention having been given to them. He is also aware that there are methods much more perfect than those with which he is acquainted, but on which as a professional photographer he finds great difficulty in procuring information, particularly on a subject of such increasing value to those who possess any secrets of their own; and unfortunately there are few of sufficient liberality to make public all they know.

PRINTING OR TRANSFERRING TO PAPER.

162. As without some instructions for making use of them, the negatives towards the production of which so much attention has been directed, would be of no value, the writer has to offer from the many formulæ that have been proposed a selection of those most likely to be generally useful; he would at the same time wish it to be understood that, in preference to those capable of giving brilliant results, but at the expence of much time and labor, he has chosen those which from their simplicity are most likely to be serviceable to the beginner, leaving to

the more practised operator the task of working out the improvements he may think necessary.

163. There is a marked difference between papers manufactured in England and on the Continent, most of those made abroad having a large portion of starch in their composition, and from that circumstance affording black colors readily, while in the English papers the starch is generally replaced by gelatine, and the black colors can only be obtained with difficulty. In many papers there is also a large quantity of chloride, which affects materially the results to be obtained upon them. One description made by Nash contains so much, that with no other preparation than brushing over a fifty-grain ammonio-nitrate of silver solution, very beautiful proofs are to be obtained. There is also a foreign paper which contains a larger quantity, at all events sufficient to render an alteration in the strength of the solutions necessary.

164. The apparatus required need be neither complicated nor expensive, all that is actually necessary being comprised in the following list:—

165. A few pieces of stout plate-glass rather larger than the pictures they are to be used in in printing,—some plain, others having smooth black cloth evenly pasted over one of their surfaces.

166. Some drawing boards, on which to pin the paper when the solutions are applied by brushing.

167. Two or three brushes made expressly for photographic purposes.

169. Some dishes for washing the proofs after fixing them.

170. Bibulous paper.

171. When a sheet of paper has been rendered sensitive by either of the following means, it is to be laid, the prepared side up, on one of the covered glasses; the collodion negative is to be carefully placed, the coated side downwards, upon it, and then upon that one of the plain pieces of plate-glass, the weight of which will be sufficient to bring the negative into close contact with the paper. After having done this in a moderately dark room, remove it to where the light of the sun, or even diffused daylight, can have free access to it for a time, varying with the intensity of the negative and the light, until it is dark enough. It may safely be looked at, by first carefully taking off the upper glass, and then while one end of the negatives is pressed firmly on the paper to prevent it slipping, the other is lifted just high enough to allow the progress of the picture to be seen. If it is not dark enough the glass must be lowered down, and it must be again exposed to light.

172. Some difficulty may be found at first in returning the glass to precisely the same place it before occupied on the paper; a little practice will, however, soon enable the operator to do it successfully, and as so much of the beauty of the proof depends upon having the proper amount of light, he must frequently inspect its progress: he will therefore do well to master this piece of manipulation as soon as possible.

173. The proof should always remain in the light until it is considerably darker than it is desired to be when finished, to allow for the loss it always sustains in the hyposulphite bath, and it should be borne in mind that an under-printed picture cannot be improved, while one that is too dark can, by prolonging the action of the hyposulphite, be reduced to almost any extent.

174. There are several ways of applying the solution to the paper; those generally practised being either by the brush or by floating the paper on a quantity of the solution placed in a flat dish.

175. When only small quantities of paper are wanted, it will generally be most advisable to apply the solutions by brushing, it being the most economical method. It will also be found that if a quantity of a solution is prepared, it will by brushing yield uniform results so long as any remains, while if applied by floating, a constant change goes on; so that when a comparison is made between the first and last sheets prepared, it will scarcely be possible to believe that the same process has been followed.

176. The use of the brush has been much condemned; not, as the writer believes, from its being really difficult or wrong, but from the unnecessary cautions which have accompanied directions which have been given for preparing sensitive paper by its means. The paper to be prepared should be pinned by its corners to a smooth drawing-board, having previously placed a piece of white blotting-paper somewhat larger beneath it to absorb any solution that may pass over the edge. The solution is then to be brushed freely over it, first in one direction and then in the other, crossing the strokes so as to ensure an equal coating, repeating the operation if any inequality is observed. Sufficient of the solution should be applied by brushing in the first direction, the subsequent crossing being for the purpose of rendering that equal. Very little practice will enable the operator to apply just so much that by crossing once or twice there shall be no patches unabsorbed. When free from running moisture, the paper is to be pinned up by a corner to dry.

177. It is not necessary to have the paper perfectly dry before applying the silver solution, more brilliant proofs being obtained by its being brushed on while slightly damp. After the silver solutions is on, however, the quicker and more perfectly it is dried the better.

178. The operator must not be deterred by this caution from laying by a stock of salted or half-prepared paper, if so inclined, the difference being very slight; still, as there is a difference, it is thought right to mention it.

179. For floating the paper, a much larger quantity af the solutions will be required. They must be poured into a flat dish to the depth of about a quarter of an inch, and then the paper, previously cut to the proper size, is to be floated, by first placing one end on the fluid, while the corners of the other end are held by the fingers, bringing the whole gradually down upon it, and exercising sufficient pressure to prevent any air-bubbles from remaining. When the ends cease to curl up (generally after one or two minutes), it is to be slowly raised, and then pinned by a corner to the edge of a shelf or table; and to facilitate the draining, a small piece of bibulous paper is to be attached to the corner from which the liquid drops. It is to remain suspended until dry.

180. One of the best formulæ for use with the brush is the following:—

1st sol. Hydrochlorate of Ammonia....	5 grains.
Distilled Water..............	1 ounce.
Iodide of Potassium..........	½ grain.

This solution may be applied at any time, no harm resulting from the paper being kept.

181. 2nd sol.—A fifty-grain solution of ammonio-nitrate of silver, which may be made as follows:—Dissolve 50 grains of nitrate of silver in about three quarters of an ounce of distilled water, and when perfectly dissolved add, drop by drop, a solution of ammonia; this will at first cause it to become turbid, but by cautiously continuing the addition, it will again become clear. No more ammonia than is just sufficient to redissolve the precipitate should be added, and, to be certain that no excess is present, a few drops of a fresh fifty-grain solution of nitrate of silver are to be added, to render it again very slightly turbid. The whole should then be poured into a glass measure, and distilled water added to make up a measured ounce.

182. If there is any excess of ammonia, no care will enable one to obtain an even coating by brushing, the traces of the brush where last past over coming out distinctly in printing. If, however, the correction is carried much too far, the print, although quite even, will be indifferent, and have an effect of color in some cases very remarkable, the lighter parts of the picture coming out when finished of a greenish tone, while the shadows are brown. This is more generally the case when small quantities of chloride are used; with the proportion above given it is very seldom seen.

183. This solution is to be brushed on in the same manner and quantity as the first solution of hydrochlorate of ammonia; and as soon as it is sufficiently dry to allow of its being hung up, it is to be pinned to the edge of a shelf in a dark room, or, which is much better, thoroughly dried at a fire. The paper will not keep long after the application of the second solution;

for, even if secluded from light and air, it will in the course of two or three days discolor.

184. If with this formula French (starch) papers are used, the color of the finished proofs will be of a black tone; but with the English (gelatine) papers, the color will be a rich brown.

185. The use of ammonio-nitrate of silver has been, without reason, much attacked of late, on account of the supposed want of permanency of proofs procured by its means. This the writer ventures to think is an error, most of the blame it has been visited with being due either to the small quantity of chloride formerly recommended to be used with it, to the use of old and acid baths of hyposulphite, or, which is quite as frequent, the carelessness of operators themselves in washing out the solutions imperfectly; and he thinks if a comparison is instituted between proofs obtained by the same operator by this and any other process, it will be found that the defective ones will be equally distributed among them, the balance being perhaps in favor of albumen; not, however, from its giving really more permanent proofs, but that from the nature of its surface it repels moisture better than the others, and so is less open to injury.

186. Another good formula for use with the brush is the following:—

1st sol.	Chloride of Ammonium	8 grains.
	Iodide of Potassium	½ grain.
	Distilled Water	1 ounce.
2nd sol.	Nitrate of Silver	80 grains.
	Distilled Water	1 ounce.

N.B.—Paper prepared by this formula will keep much longer than by the last.

187. For floating, it is necessary to have a larger proportion of chloride than for brushing. The following answers well:

1st sol.	Chloride of Ammonium	20 grains.
	Iodide of Potassium	½ grain.
	Distilled Water	1 ounce.
2nd sol.	Nitrate of Silver	90 grains.
	Distilled Water	1 ounce.

188. The same time should be allowed for floating, both on the chloride and on the silver, a longer time to either being equivalent to a larger dose. If the proofs when finished are too brown, a short time on the silver or a longer on the chloride will produce a blacker tint.

189. There remains now only to mention albumenized paper, which, as affording positives of high finish with but little experience, has met with much favor. One of the many formulæ for its application that have been recommended is the following:

190. Take any quantity of the whites of eggs, and add to it an equal bulk of distilled water, then to the mixture add hydrochlorate of ammonia in the proportion of half a grain to each measured ounce. The whole is then to be well beaten with a silver fork, or, what is much better, placed in a porcelain egg-beater and well shaken. By allowing it to remain at rest for twelve hours, all the fibrous portions will sink to the bottom, and the limpid upper portion can be decanted off for use. It may be applied by floating; not more than one minute, if the operator is practised from a quarter to half a minute; the shorter the time the better. The papers best suited for albumenizing are the thin French and German. English kinds have not answered in the writer's hands.

191. When dry, the paper should be ironed with a moderately hot iron, previously placing it between two sheets of clean, smooth paper, and should then be laid by in a dry place: it will keep for any length of time.

192. When required for use it may be made sensitive by floating it for two or three minutes on the following solution:—

Nitrate of Silver	50 grains.
Glacial Acetic Acid	2 minims.
Distilled Water	1 ounce.

FIXING THE PROOFS.

193. To fix the proofs which may be obtained by either of the foregoing methods except the last, the following solution can be used.

Dissolve in a bottle—

Hyposulphite of Soda	1 ounce.
Filtered Water	5 ounces.

194. In another bottle dissolve 15 grains of nitrate of silver in half an ounce of distilled water; and when dissolved pour it into the solution of hyposulphite; shake the two together, and let the mixture stand twenty-four hours before using.

195. The proofs should be carefully immersed in this bath, and be allowed to remain not less than an hour. If, however, they should have been so much over-printed as to require reducing still more, they may remain a longer time. After removal from this bath, they should be immersed for about ten minutes in a fresh solution of hyposulphite of the same strength as that just recommended, but without the nitrate; they may be then well washed in a dish of hot water five or six times, draining them well between each, and allowing them to remain in the two last a quarter of an hour or more; they may then either be pinned up or hung over glass rods to dry, and should afterwards be smoothed with as hot an iron as can be used without scorching.

196. By the process of Le Gray, in which blackened chloride of silver is used in the proportion of seventy grains to each ounce of hyposulphite in solution, very beautiful proofs of a neutral tint can be easily obtained; but if we wish for the additional security afforded by washing with hot water, we must sacrifice much of this beauty and be content with dull brown colors.

197. For the albumenized paper (and if desired for all the others), the following fixing solution may be employed:—

Hyposulphite of Soda	1 ounce.
Distilled Water	5 ounces.

198. When the hyposulphite is dissolved, add two grains of chloride of gold previously dissolved in half an ounce of water; this will probably cause a precipitation of a small quantity of sulphur, which will have to be removed by filtering through bibulous paper. When clear, the solution will be ready for use. The proofs must be watched, and should be removed when the desired color is obtained. They will at first become brown, but will gradually get blacker and blacker until they attain a rich purple. The change with a new solution goes on rapidly, two or three hours sufficing for the black colors, but after a time as much as even twenty-four hours will be needed, still they *can* be reached by giving time so long as the hypo has any solvent power left.

199. The proofs must be well washed as before recommended, and if hot water is preferred it may with more safety be used.

200. Although breaking through the writer's intention of mentioning only those methods of easy application, he cannot pass over Le Gray's very beautiful process for obtaining purple and black colors; but at the same time he would caution those who attempt its practice that, although perfect in the hands of those who have had experience, it is of all photographic processes one of the most difficult to manage successfully.

201. Paper prepared with plain nitrate of silver is better for this purpose than the ammonio-nitrate. The prints should be exposed much longer than for the ordinary method of fixing, in fact until the whitish parts are of a violet hue. After the proof has been so exposed, it is to be immersed in the following solution, taking care to move it about while in:—

Distilled Water	2 ounces.
Chloride of Gold	1 grain.
Pure Hydrochloric Acid	10 minims.

202. The picture clears immediately after immersion, becoming altogether lighter. When nearly light enough, it is to be washed in several waters to remove the acid, and then immersed in a bath of hyposulphite of the strength of one ounce of the hyposulphite to six of water, in which it is to remain not less than half an hour; it is then to be washed and dried as usual.

203. Very good results are to be obtained by reversing the application of these solutions; that is to say, by first over-printing the proof, then fixing in the hyposulphite, and then, after washings, immersing in the acid bath of gold, and again washing. Perhaps the last is the most secure of all methods of fixing.

204. The process for printing enlarged copies from small negatives is so interesting, and of so much value, that a short notice respecting it may be of service, particularly as the writer is not aware of any method having been published by which good proofs can be obtained.

205. A hole rather larger than the size of the negative should be cut in the shutter of a darkened room, into which a sheet of waxed paper or ground glass is to be inserted, and if a slide is made to fit an ordinary camera of long focus, so as to receive the negatives and allow of light passing through them, we have all the apparatus necessary.

206. The negative fitted in the groove at the back of the camera must be brought within a few inches of the ground glass in the shutter, and, to prevent the diffusion of light in the room, a black cloth should be thrown over the space between the negative and the ground glass.

207. An ordinary double-portrait lens answers well, in fact, with the exception of the slide for the negatives, the camera and lens remain as generally used, the image being thrown from the negative through the camera and lens on to a screen. With it portraits of any size may be obtained from the same negative, subject only to the range of the camera and the size and distance of the screen and paper.

208. Turner's "Patent Talbotype" paper is to be immersed, twelve sheets at a time, in a solution of iodide of potassium of the strength of three grains to the ounce of distilled water, and after half-an-hour's immersion is to be hung up to dry. It will keep for several months.

209. The following solution is required for exciting:—

Nitrate of Silver	15 grains.
Acetic Acid	15 minims.
Water	1 ounce.

210. Just before use, immerse completely in this solution one of the sheets of iodized paper, and allow it to remain ten minutes, then take it out, and without blotting lay it on a sheet of glass perfectly clean, and place it on the screen (which should have wooden buttons to secure it) and by placing a piece of yellow glass in front of the lens the image may be focussed upon it directly; when perfectly sharp and distinct, the removal of the yellow glass will allow the light to act.

211. The time of exposure of course depends upon the amount of light, but with a bright sun shining upon the ground glass, and with a good lens, ten minutes will generally suffice.

212. The image should be slightly visible before developing, to do which (to develope) remove the paper from the glass and immerse it in a saturated solution of gallic acid, adding for a twelve-inch picture, half-a-dram of the exciting solution. When sufficiently developed, immerse in common water and wash several times, then fix by immersing in a solution of hyposulphite of soda, of the strength of one ounce to four of water, until the yellow iodide is entirely removed, and wash again thoroughly in several waters, allowing it to soak in the last two or three hours.

213. When dry it will be finished.

214. We have now, from the first preparation of the glass to the final fixing of the proof, gone, it is hoped with sufficient care, through what is called the Collodion process; and if, in his attempt, the writer should have succeeded at all in removing the obstacles which unavoidably accompany the study of an art involving chemical changes of great delicacy, he will have the satisfaction of thinking that the time he has given to Photography has been better bestowed than if his own amusement or profit had been the sole result.

WEIGHTS AND MEASURES EMPLOYED.

215. In almost every instance the quantity of solid substances has been mentioned as so many grains, but where the ounce or dram is mentioned, the ounce of 480 grains and the dram of 60 grains are to be understood.

216. When fluids are mentioned the *measured* ounce is meant, and the ounce is divided into eight drams of sixty minims each.

SOLUTIONS REQUIRED FOR NEGATIVES.

217. Sensitive bath—

Nitrate of Silver	40 grains.
Alcohol 60°	30 minims.
Distilled Water	1 ounce.
Iodide of Silver to saturation.	

These must not be mixed direct, but the directions given in the body of the work must be followed.

218. Developing solution—

Pyrogallic Acid	1 grain.
Acetic Acid	5 minims.
Alcohol	10 minims.
Distilled Water	1 ounce.

219. Silver solution for developing—

Nitrate of silver	40 grains.
Distilled water	1 ounce.

220. Fixing solution—

Hyposulphite of soda	10 ounces.
Filtered water	20 ounces.

221. In the different formulæ given it is supposed that all the chemicals are *pure*, the acetic acid *glacial* (solid at 40°), the nitrate of silver crystallized; the alcohol free from all extraneous matters, and the water, except where otherwise mentioned, distilled.

222. Those who are desirous of making collodion for themselves, or in fact of making any exact experiments, should learn the use of the specific gravity bottle, it being impossible without it to be sure that we can repeat any experiment successfully; very few chemical liquids being sold of known or uniform strength, although they may be pure in so far that they are free from anything but water, still upon the quantity of that may depend the success of an experiment which has occupied much time.

The specific gravity bottle is made of very thin glass, having a perforated stopper, and capable, when filled and the stopper inserted, of holding exactly 500 grains of distilled water at 60° Fah.

These bottles are sold with a counterpoise of the exact weight of the empty bottle, so that when it is filled with water and placed in one scale of the balance and the counterpoise in the other, 500 grains will be required to bring it into equilibrium. All that we have to do, therefore, with any liquid, the specific gravity of which we are desirous of ascertaining—such as ether, alcohol, or sulphuric acid,—is to fill the bottle and insert the stopper, when any excess will come up through the hole and must be wiped off. When perfectly dry it is to be weighed, and whatever the weight may be required to balance it, such as for washed ether 360 grains, or sulphuric acid 920 grains, by multiplying by 2 we get the specific gravity as compared with water, or 1000; for instance, ether, sp.g. ·720; sulphuric acid, sp.g. 1·840. In the case of these two liquids dilution would be detected in opposite ways, the ether would be heavier, the acid lighter.

223. In weighing solids it is a good precaution to cut two squares of writing-paper to put into the scales from the same piece of exactly the same size; this is easily accomplished by folding a piece and cutting them together from it with a pair of scissors. If this is done for everything we weigh, there is little fear that anything wrong will get into our solutions, as we can by procuring chemicals from respectable houses be almost sure of their purity, more so than of the strength of the fluids required.

224. Care should be taken that all measures are quite clean and dry, and that the bottoms are also clean.

225. The smallest trace of hyposulphite on the camera frames or in the developing solutions will cause the plates to be stained.

THE PHOTOGRAPHIC GALLERIES OF AMERICA.—NO. III.

THE RICHMOND GALLERIES.

Richmond, July 1, 1856.

H. H. Snelling—*Dear Sir:* I have been very much pleased with some spirited notes on some of the galleries in the north, by "Cuique Suum," and have been waiting hoping that he might favor us with his presence, and tell you what he thought of the Richmond galleries, but I suppose he does not think it worth while to come so far south for so small an object. I will therefore undertake the task myself, and if I am not mistaken in supposing that it will not be done by an abler pen, you will please give them a place in your invaluable Journal. Richmond contains a population of about 40,000. To supply these with their *fac similes*, we have seven galleries and two *humbugs on wheels*, but as they are "out-side barbarians," I will not take up your time and room to notice. Our galleries are all located on Main Street, the Broadway of Richmond. Whitehurst being the first from the James River I shall notice first, and so on as they come in order. Whitehurst's is a spacious, well-finished, and well-arranged gallery, it has two large skylights. In former years this establishment did a thriving business, and three or even four lights, could then have been used to advantage; the old saying, "neglect your business and your business will neglect you," has been clearly verified in this instance. The business has fallen off, and crept slowly and gradually up town, so that now one light would suffice for a whole neighborhood of such galleries. I noticed some few good daguerreotypes, but they are mostly dull and rusty, and want either rubbing up or rubbing out—a little of both would very much improve the appearance of this gallery. Mr. Morse who has had charge of this establishment for the last six months, is, beyond doubt, the best ambrotyper in the country; he is the Rembrandt of photographers. His pictures have a grace and delicate beauty seldom seen in sun pictures.

Bendon.—Photographs seem to be this artist's forte; he was the first to introduce them to any extent in this city. I believe he has done a brisk business, since he commenced, a few months ago, which is calculated to keep up one's spirit, but with this artist it has had a contrary effect, for right in the midst of his business he *took the Blues* (a military company), and has not got entirely *rid* of *them* yet, although he has been *taking golden pills from them* daily. His large photographs of Gov. Wise and Wm. F. Ritchie, are fine specimens of the art. His ambrotypes are not so numerous nor so good as his paper pictures. If he would take a few lessons from some first-rate ambrotypist, he could excel in that, as he now does, in all the other branches of the art.

Duke.—The specimens of this establishment, are complete charicatures on the art. Big heads on small plates, young ladies with boquets in their hands, old ladies with either an orange or a red book clutched firmly between their fingers. Then imagine here and there a dab of red or yellow paint, marking out a watch or chain or some other jewelry, and you will have a good idea of these pictures, furnished all complete, gotten up and colored after the manner I have described, for the very *low* and *degrading* price of 50 cents. This establishment has not yet meddled with glass pictures; and for the sake of the art, for which I have always had a reverence, I hope it never will.

Pratt's Gallery.—This establishment is now under the management of Jno. Sanxay, who is a good artist; very many of his daguerreotypes are excellent specimens of the art. A slight cleaning would not hurt some of them. His ambrotypes are quite good in tone, but somewhat faulty in arrangement of position, and in finishing, he does not exercise sufficient care. I must do him the justice, however, to say that his experience in this new feature of the art, has been limited to a few months only; but as he is a young man full of ambition and running over with energy, in due time we may expect to see him a second Morse in the arts.

Simons—Has some good ambrotypes and some very poor ones; they are not, on the whole, near so good as his daguerreotypes.

Osborne.—Although a tolerable daguerreotyper, is an intolerable ambrotyper. His ambrotypes are gray and dull; they look more like Daguerres' early daguerreotypes than they do ambrotypes. It would be difficult for you or any one else, to imagine a glass picture that comes so far short of a genuine ambrotype as these do, whether they are over-done, under-done, or done just right, that is as far as time of sitting is concerned, they are alike poor things, mere apologies for pictures. Unless he changes his mode of operating, and studies light and shade more, he will never succeed; and some friend should whisper this fact in his ear.

Gibbs.—His specimens are exclusively ambrotypes—some of them are pretty good, with the exception of the positions, which are mostly stiff and awkward. I would recommend him to study Qulian on positions. How sadly mistaken many are to suppose that artistical pictures can be made without the slightest taste or knowledge of drawing; hence it is we have so many indifferent picture makers scattered all over the country.

I have now finished, and I believe that I have given you a *photographic* description of our Richmond galleries. If any complain of the crude "matter of fact" pictures I have sent you, it is not my fault, but the fault of the camera, having a sharp and broad field, takes in everything before it, good, bad and indifferent. I have merely *developed* them and send you the *results unvarnished* and ready for *printing*. An Amateur.

PHOTOGRAPHY ON COLLODION.*

BY D. VAN MONKHOVEN.

CHAPTER VI.

EXPOSURE TO LIGHT.

The time of exposure in the camera depends on the intensity of the light, the diameter and focal length of the object glass, the rapid or tardy action of the collodion, and the developing method employed. In the month of January last, we took a positive view in the direct light of the sun with the sulphate of iron, using a simple object glass of 7·90 in. focus, and a diaphragm of little more than ½ an inch diameter. This proof was strictly instantaneous.

We have obtained negatives with the same glass in four seconds. Clouds have been taken instantaneously, but the light must have been extremely strong. In summer, we obtain negative views in the sun in the fraction of a second with pyrogallic acid, and the view object glass. With the double objective of 11·70 in. focus and 4·29 in. diameter, it is impossible to open and close the tube sufficiently quick; in this case, it will be well to fit a sort of a wooden plate to the front of the tube which falls rapidly and closes the aperture at once. In the case of sulphate of iron positives, the diaphragm must be used and the strictest care given to it. Iodide and bromide of cadmium collodion, are also very rapid.

Portraits generally demand ten times as long an exposure.

Portrait object glasses should have large diameter and short focus to work quick; large glass objectives, moreover, possess less spherical aberration, as the focus may be somewhat longer than in ordinary glasses.

For views, it is best to have three lenses of like diameter, but different focus. The diameters and focusses which we consider as most favorable for different sized pictures are the following. One copper tube is sufficient for the three.

Views of Centimetres.	Diameter. Millimetres	Focus of 1st glass. metres	Focus of 2nd glass. metres	Focus of 3d glass metres
16×22	80	0·30	0·45	0·60
23×30	95	0·40	0·60	0·80
30×40	108	0·50	0·75	1.
40×55	135	0·70	1·05	1·40

* Continued from page 179.

If the view to be taken be very near, and the object glass be of long focus, it is clear that the rays refracted by the lens will cover a much larger space than the surface of the ground glass. We cannot therefore, without going further back, get the view upon a single plate. With a glass of very short focus, there will of course be a slight aberration, but at least we will obtain our pictures entire. For distant views, a long focus objective is employed for the contrary reason, viz to have the picture isolated on the glass. Lastly for mean distances, an object glass of mean focus must be employed.

In this way it will be perceived we shall have a complete apparatus. In cities, it is almost always necessary to use short focusses.

French opticians give simple objectives a very long focus, and English opticians on the contrary, a very short one. Mr. A. Ross of London, gives a focus of 75 centimetres (29·30 in.) to a glass for the production of views of 50 centimetres by 55, whilst MM. Lerebours and Secretan, of Paris, give the same glass a focus of 1·50 centimetre (47 in).

In a view glass it is known that the smooth side should always front the object, and the convex side the ground glass.

The portrait apparatus of Voigtlander and Sohn, Vienna, are thus far considered the best, but it is our duty to say that Mr. Andrew Ross, of London, will soon be equal in this respect, if he has not already attained perfection.

When glasses give a vast amount of light and great delicacy, the curvature of the lenses is so well combined with the dispersive and refractive powers of the flint and crown, that achromatism for the principal colors is very nearly attained, and the light is also so concentrated upon the plate as to produce a very intense light. The apparatus which Mr. Ross constructs presents an important advantage over the Vienna glasses, in not possessing chemical focus, and in not centralizing the light.

French opticians have lately, after much labor, succeeded in producing glasses which rival the English for the delicacy of their results and the intensity of their light; application must be made, however, to the best houses. We just mentioned the word centralization. Some persons have not a correct idea of the meaning of this word. We therefore deem it right to observe that a compound object glass centralizes light, when, on account of the curvature of the glasses, the extremities of the plate show greater *intensity* of light than the centre, although as regards *clearness* there be little distinction.

As to chemical focus, every one knows how to correct its disastrous effects, but that an object glass which has no chemical focus for paper and plate has one for collodion, is a fact of which many are ignorant.

We find the following in an interesting communication made by MM. Lerebours and Secretan to the Academy of Sciences. "An object glass of 11·70 in. focus and 4·30 in diameter, which for the plate showed no difference in focus, gave for collodion a chemical focus of over a millimetre."

CHAPTER VII.

DEVELOPMENT OF THE PICTURE.*

There are four developers for collodion: gallic acid, pyrogallic acid, sulphate of iron, and protonitrate of iron. Doubtless in the course of time, other reducing agents will be discovered and applied, and already has Mr. Barker, an English photographer, proposed a fifth, binoxide of azote.

Gallic acid was doubtless primitively made use of by English operators on their first experiments. The pose required to take a picture with this developer is extremely long (three minutes in the sun with a double object glass). On removal from the camera, the glass is placed on a levelling stand and receives a saturated solution of gallic acid. The picture appears in a few minutes, gains strength slowly, and in the course of time, assumes a vigorous aspect. The gallic acid is from time to time renewed, it is mixed in this case with one-tenth its volume of a weak solution of nitrate of silver. The picture almost always becomes loosened from the plate and does not present as much intensity as when developed with pyrogallic acid, this method was therefore abandoned at its very origin. Pyrogallic acid is the par excellence negative developer, and only requires a very short exposure in the camera, that is in proportion to gallic acid. To work without loss we use a glass dish constructed by fastening slips of glass around a glass plate by means of sealing wax.

This dish must stand perfectly level. Place the collodioized glass in the dish, collodion side up, and pour over it the following solution, commencing at one of the corners:

Water	400 grammes.
Crystallizable Acetic Acid	15 to 30 "
Pyrogallic Acid	1 "

Or else in the case of positives—

Water	1000 grammes.
Crystallizable Acetic Acid	25 to 40 "
Pyrogallic Acid	1 "

We should work in such a way that the liquid shall cover the entire glass in the shortest time possible, to prevent unequal development.

If the object to be reproduced present very contrary tints, as white walls by the side of very dark buildings, the quantity of acetic acid must be increased. If on the contrary there be little opposition, it will be well to diminish the dose; the effect of this acid being by retarding reduction to preserve the blacks while strengthening the transparent parts. Thus in the case of a dark structure by the side of a white wall, if the proportion of acetic acid were small, the wall would be of such a decided black, that the details would be invisible, even before the dark portions of the structure appeared. If on the other hand we had only to reproduce the latter, it would be necessary to endeavor to give artificially greater intensity to the very clear parts, than the original really possessed, by making use of very little acetic acid.

We think therefore, that an observing operator will know how to profit by the latitude allowed him in the formula we have given.

Pyrogallic acid used to develop positives should be extremely dilute, to avoid giving too great opacity to the blacks; as soon as the picture shows the first signs of its appearance, the action of the reducer must be arrested by plunging the glass into water. For this kind of proof, protosulphate of iron is moreover of much more simple use. Instead of crystallizable acetic acid, we most often make use of common acetic acid, the degree of acidity of which we find out by comparing the relative quantities necessary for the formula, and latter to be neutralized with one gramme of caustic potash. Common acetic acid generally contains three times more water than crystallizable acetic acid. It will therefore be necessary in this case, to augment the proportion three times in the dosage mentioned in the formula.

Let us now return to the glass on which we have poured the pyrogallic acid: the picture works very slow at first, but gradually gains strength. The development is watched by transparency. The acid which covers the proof very soon assumes a dirty gray color, the slightest details in the shades become well developed and acquire intensity. It will be well to keep the dish in a gentle motion to prevent the precipitate formed from adhering to the proof. The picture vanishes altogether when viewed by reflection, but by transparence it presents a beautiful appearance; skies and other clear parts of the design assume a powerful black, and the minutest details of shade are well depicted. Lastly, the action of the reducer must be arrested at this point, and the glass plunged for this purpose in filtered water. The proof is then washed in several changes of water and fixed.

If, during development, the proof does not possess sufficient intensity, we must add fresh pyrogallic acid to which a little nitrate of silver has been added in such proportions, that one gramme of pyrogallic acid corresponds to two grammes of nitrate of silver. We would therefore employ—

* This operation it is known, should take place in the dark, under the same conditions of colored light as for sensitizing.

Pyrogallic Acid at the 400th....40 cent. cubic (Preceding formula).

Water........100 } 2
Nitrate of Silver 10 }

These liquids should not be mixed before the moment of pouring them on the glass. In this way we obtain all desirable intensity.

It is in the developing bath that we discover whether the pose has been too short or too long: in the former case the proof does not attain sufficient vigor; the skies and other very white portions are in fact excellently rendered in an opaque black, but the mezzo-tints are not sufficiently intense. In the second case, the mean tints attain the same value as the pale tints, the entire design assumes an uniform red color, the skies remain transparent and do not in any wise intrench upon the dark shades.

A short pose is therefore best, we can always give greater vigor to the under-developed parts by a strengthening process.

With sulphate of iron proofs never attain sufficient intensity, and we are always obliged to strengthen. Pyrogallic acid gives deeper blacks, and a blueish tint descends even to the transparent parts. But if the bath of iron is inferior for the production of negatives, it makes up largely for this disadvantage in that it is infinitely superior for obtaining direct positives. For persons who practise photography as a pastime, this process is extremely simple, while at the same time the pictures produced by it are highly beautiful, and rival the metallic plate in delicacy, without the disadvantage of reflection. The bath of iron is generally prepared in the following manner:

	Cubic Cent.
Saturated Solution of Sulphate of Iron (filtered)	1000
Common Acetic Acid	100
Nitric Acid	5
Acetate of Silver (at the 10th)	20

The substances being mixed as we have mentioned above, it is well to heat the liquid to the boiling point, and then leave it several days to subside. Acetic acid is added to prevent the reducing agent from veiling the proofs, and nitric acid in order to form a binoxide of azote in the bath, which in a few hours renders it analogous to those which have been some time in use; experience has proved that the latter are the best.*

* The bath of iron sometimes produces singular results, which might be strongly doubted were it not that experiment has positively proved the fact: we had an old bath of iron which would give nothing but veiled proofs, which convinced us that the best way to do was to make another; we dissolved protosulphate of iron in water, and after filtering we added acetic acid. The proof, after having received the luminous impression, was *plunged* therein, and no proof was developed; another part of sulphate of iron was dissolved in water. and a little acetic acid and acetate of silver added. The metallic silver disturbed the liquid, and this modified bath developed a second proof. From this experiment therefore, the sulphate of iron must have dissolved the film of metallic silver as soon as formed; the first proof, in fact, submitted to the action of a new concentrated bath perceptibly lost strength. We added acetate of silver to the baths which had not yet been used, and they developed the pictures in the usual manner. But this experiment shows something more curious still; if a nitrate, or better still, nitric acid is added to the bath of iron (which has not yet been used), the latter will, notwithstanding, bring out the picture the first time. What is the effect then that nitric acid produces in this case? it tends, it is true, to superoxydate the protosulphate and develop binoxide of azote, but the persulphate of iron and the binoxide of azote added directly produce not this effect. Here then exists a hidden cause which changes *adinfinitum* the effects of the reducing agent.

Did we not fear being too lengthy, we would here show the most curious experiments made with the sulphate of iron; experiments which put us in the way of giving to the bath of iron the property of developing as vigorous pictures as pyrogallic acid. When we prepare an iron bath for our own use, we substitute nitrate of potash for the nitric acid, having discovered that more beautiful metallic blacks may be thus obtained. We work in the following manner: Pour into a graduating glass 40 grammes of water, into which put 10 grammes of nitrate of potash; when the salt is dissolved, add two grammes of liquid nitrate of silver. Pour iodide of potassium into the solution until the silver precipitate no longer forms. Expose the glass to the sun for a few seconds, and lastly pour the whole into a quart solution of acetic sulphate of iron.

Thus prepared, this bath gives highly beautiful metallized whites. It is better however, to boil it two or three minutes before using the first time, and then allow it a few hours to cool and subside.

The exposure to light should be much shorter than with pyrogallic acid. The liquid is poured into a china saucer and filtered after each operation. The glass is immersed therein without allowing any time to elapse, collodion side up. It is held in it for several seconds. The proof gradually appears, and should present, by transparency, a feeble picture. In the fixing bath it becomes magnificent. Once developed it may be exposed to the light, but if left too long to its influence, it would become veiled. If the proof be veiled, and if the whites present details by *transparency* without showing them by reflection, we may know that the pose was too long. If on diminishing the pose, the whites do not present these details by *reflection*, it is an indication that the collodion contained too much iodide. If the very clear parts of the object alone appear, to the exclusion of the shades, the pose has been too short.

It is important here to remark, that the grey deposit formed in the sulphate of iron after each operation, must not be thrown away. This precipitate is metallic silver.

If the bath of Iron, after being used for a greater or less time, veils the proofs, a certain quantity of acetic acid must be added.

To obtain a perfectly pure proof, it is necessary that the collodion film present a greasy surface to the sulphate of iron, which water cannot easily penetrate, so that on removal from the iron bath, the film may present marblings and veins analogous to those formed in the bath of silver. To produce this effect, we have added ether and alcohol to the sensitive bath.

Another reducing agent has been employed for some time with much success—protonitrate of iron. It appears that this salt has the property of giving extremely beautiful whites. As it is a substance which easily decomposes, we believe its use will be restricted from the difficulty of obtaining it pure.

The following, however, are the proportions to be employed:

	Grammes.
Water	100
Sulphate of Iron	10
Protonitrate of Iron	10
Crystallizable Acetic Acid	10
Nitrate of Silver	1

Proofs are subject to various mischances during development, the principal causes of which are the following:

1st. The film will loosen from the glass under the action of pyrogallic acid, if the collodion contains too much water, if the proportion of the iodides to the quantity of gun cotton is too great†; and if, lastly, the dose of ether is too slight.

2nd. The proof will be greatly soiled, if (the bath of silver being very greasy on account of the addition of ether and alcohol) we merely pass to the bath of iron. As the latter, they only wet the film in certain places, the picture will appear in these places and form irreparable marblings. We must therefore *keep* the proof in the bath for several seconds.

3rd. There will also be stains if the bath be covered with fine dust, or if the collodion has not perfectly subsided. These two causes produce stains of metallic silver. The best way to prevent them is to allow the baths to subside for forty-eight hours.

CHAPTER VIII.

FIXING THE PROOF.

Unchanged iodide of silver still remaining in the film of collodion would at length become affected by the light, if the precaution be not taken to remove it by means of a dissolvent.

The best fixing agents are cyanide of potassium and hyposulphite of soda.‡

Water	1000 grammes.
Liquid cyanide of potassium	25 "

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† In this case, the proof when fixed will be effaced by a current of air.

‡ The baths of hyposulphite and cyanide of potassium, and the bottles containing it should be banished from the dark closet when the operations are carried on. These substances free certain vapors injurious to the sensitizing process. Great care must also be taken not to get any hyposulphite into the sensitive bath.

Water	1000	grammes.
Hyposulphite of soda	400	"

These liquids last a very long time: the first should be kept in a tight bottle as it is decomposed by air.

If these substances are not at hand, a saturated solution of sea salt in water may be used instead; it has not, however, as an powerful effect as the former.

As a general thing whatever be the dissolvent employed, it is well to *immerse* the plate in the liquid and leave it there until the milky film of iodide of silver disappears.

In the case of direct positives, before plunging the plate in the cyanide, it must previously be freed from all traces of sulphate of iron by repeated washing, otherwise the proof will be stained in every direction with a yellow precipitate. Cyanide of potassium is preferable for this sort of picture, as it gives more beautiful blacks. To fix negatives hyposulphite is better, as it does not attack the film of metallic silver with much force.

As soon as the milky iodide has disappeared, wash the plate carefully to remove the fixing liquid, which would otherwise dissolve, at length, the weak parts of the picture. Fixing with the bromides of potassium, persulphate of iron, etc., has been abandoned since the discovery of the superior excellence in every respect of hyposulphite of soda.

CHAPTER IX.

STRENGTHENING THE NEGATIVE.

If the formulas we have given be carefully observed, and we correctly dissern the relation of pyrogallic acid to the duration of the pose, and the intensity of the light, our negatives will never need strengthening. In every case, to render a proof capable of being strengthened, it must show a certain opposition between the extreme tints, but if it presents a uniform tint, we will never be able to give it the necessary strength to produce on drafting a good positive.

We observed that by working with care we would always obtain negatives directly, but this is dependent on certain peculiar circumstances; the length of the pose must be diminished until it borders on the strictest instantaneousness; then it sometimes happens that the proofs are too weak to draft good positives, in this case we must strengthen.

There is a host of divers methods in circulation; we will here mention the best of them:

If the proof shows nearly the desired strength, and we merely wish to give it a slight strengthening, immerse it, without pausing, in a solution of bichloride of mercury in distilled water. Some operators add hydrochloric acid to this solution; this is a bad method, for if the glass is to remain in it several minutes, the collodion film is subject to become detached.

Before immersing the proof in the bichloride, we particularly recommend the perfect removal of the hyposulphite used in fixing, if we wish to prevent the proof from being entirely veiled by the white precipitate which then forms.

The proof blackens as soon as it is put in contact with the mercurial solution; it must be removed at once and washed plentifully with water, otherwise it will lose its power as it rapidly turns white. This strengthening process is not very powerful, but it nevertheless gives great vigor to the picture.

If the proof is extremely weak, if, for instance, we wish to transform a sulphate of iron positive* into a strong negative, we must allow the bichloride to act until the entire film has become white by *transparency.* We italicise this word because proofs only whiten at first on the surface, and do not present sufficient intensity.

The picture must then be blackened by one of the following processes:

1st. Submit it to a strong current of sulphurretted hydrogen, (Prof. Donny, Jour. of Phot. Soc., Vol. I p. 186). The film whitened by the bichloride changes to a deep black, and presents all the appearance of a vigorous negative.

* It is well to employ in this case the negative collodion and silver bath, otherwise notwithstanding this powerful strengthening, the proof will still be weak.

2nd. Instead of gaseous hydrosulphuric acid, it may be employed in combination with ammonia (hydrosulphate of ammonia). Pour the liquid, diluted with water, upon the glass; the picture blackens very deeply, but this method does not give as great intensity as the preceding.

These two methods should be performed in the open air, as the slightest trace of sulphuretted hydrogen in the dark closet would suffice to cause continual failure (veiled proofs).

3rd. Pour upon the glass a solution of—

Water	100	gram.	volume.
Ammonia	10	"	

By this process the proofs present very deep blacks, but they are susceptible of change from the air, and can only be preserved by using a good resinous varnish.

4th. Lastly instead of a black we may give a yellow color to the proof. Now as yellow does not permit the luminous rays to act upon the positive paper, the effect is the same as if it were blackened by the preceding methods. To attain this result pour upon the glass a solution of—

Water	100	grammes.
Iodide of Potassium	2	"

Instead of iodide of potassium, we may use any other iodide which is soluble in water. Whatever be the strengthening method employed, it is well to give a good coating of varnish to the proof, after having been washed and dried, as the picture changes when brought in contact with air, especially by the two last methods.

There are many other strengthening processes too numerous to mention in this place; those we have given, moreover, are the most efficacious.

CHAPTER X.

VARNISHING THE PROOF.

The collodion film being extremely delicate, we must prevent its contact with the paper at the time of copying a picture, this may be accomplished by using a very strong varnish, an aqeous solution of gum arabic:

Water	100	grammes.
Gum Arabic	10	"

May be employed for pictures from which but a few positives are to be taken; but if on the contrary a large number are to be drafted, it becomes absolutely necessary to preserve it with some strong coating.

We have tried and analized numerous pseudo superior photographic varnishes, most of which have a copal base. Commercial copal varnish becomes soft when the plate becomes warm under the action of the solar rays.

A photographic varnish must unite the following qualities:

1st. It must be sufficiently fluid so as not to give too great transparence to the picture, which would deprive it of some of its strength, and sufficiently thick to effectually preserve the collodion.

2nd. It should be hard enough to bear reiterated rubbing, and to remain insoluble in water so as not to stick to the positive, from the moisture condensing on the glass under the influence of the solar rays.

3rd. Lastly, it should not melt at a temperature of from 60° to 100°

Commercial copal varnish would be very excellent did it contain less linseed oil and was not so thick. M. Legray partly corrects this defect, by adding to the varnish twice its volume of benzoin. It is carefully filtered to free it from impurities which would otherwise stain the proof.

For direct positives on glass, Judea bitumen varnish is used.

Essence of Turpentine	100	grammes.
Judea Bitumen	10	"

It is spread on the proof like collodion. It gives a very fine black ground, and much enhances the value of the picture.

CHAPTER XI.

POSITIVES ON PAPER.

Sec. I. *Choice of the paper.*—As ordinary paper contains foreign substances in the highest degree detrimental to the purity of the picture, we must find for photographic purposes something more suitable, and especially free from iron stains. It must present a very even texture, in order that it may absorb uniformly the sensitizing liquids. The smoothest side must be presented to the liquids; and the contrary side must be marked with a pencil, in order to distinguish which has undergone a preliminary operation.

Sec. II. *Salting.*—Float the paper over a filtered solution of 40 grammes sea salt or sal ammonia in a quart of rain water. Leave it there four minutes, then remove and hang it to dry. We may thus prepare as many sheets as we require, one after the other.

To prepare positive albumenized paper, employ a solution of—

	Grammes.
Filtered Rain Water	100
Albumen	from 30 to 100
Sea Salt	from 5 to 8 (4 pr ct.)

The more albumen there is in the solution the greater will be the glaze of the paper. Sea salt (chloride of sodium), some prefer sal ammoniac (chloride of ammonia), are used in salting; the latter attracts less moisture from the air, and gives a very black tone to the picture after fixing; sal ammoniac moreover furnishes a chloride of silver of finer *grain.*

Simple salted papers and albumenized salted papers, keep for an indefinite time.

Sec. III. *Sensitizing.*—The operation of sensitizing the paper, should be performed in a closet into which but a feeble light is allowed to enter; a place where the windows are covered with yellow curtains, is highly suitable for this operation.

Pour into a flat china dish a solution of 15 grammes liquid nitrate of silver, in 100 grammes distilled water. Leave the paper upon this bath four minutes and hang up to dry. If blotting paper be used, the dose of nitrate must be increased to 20 per cent. There is therefore, double the economy in drying by the first method. In using large size sheets, it is well to stand a graduating glass underneath to receive the excess of nitrate.

A whole size sheet of salted paper (18x24), absorbs nearly a half gramme of acetate of silver, we should therefore have a second flask containing 25 grammes of acetate of silver, to 100 of distilled water, and after having sensitized 10 whole sheets, add 20 cent. cubic of the solution to the bath. The bath will thus be kept at the same degree and the same volume.

Albumen being soluble in water, albumenized paper might lose some of its glaze in the different liquids in which it is placed, the albumen should be previously coagulated by heat. For this purpose enclose the albumenized paper in a blotting case, and pass a very warm iron over it. The albumen is thus rendered insoluble and loses none of its glaze in any of its baths.

If the bath of silver be used to sensitize albumen papers, it turns yellow in a few days, and communicates a disagreeable color to the proof, to remove which, Mr. Bayard adds to the bath a few grains of very pure *kaolin,* which he always leaves in the bottom of the bottle.*

It is best not to prepare too much paper in advance; in summer, especially, positive paper does not keep; the paper should be sensitized only the day before it is to be used, at the risk of seeing it turn yellow even in absolute darkness.

Sec. IV. *Exposure to light.*—First wipe the thick glass of the printing frame to avoid breaking the negative, then lay the salted positive paper (perfectly dry) in contact with the varnished side of it. Then close the braces and expose to the light, being careful that the solar rays strike the glass perpendicularly. The chloride of silver blackens in the substance of the paper and successively assumes the following tints: pale blue, then more marked, then deep blue, blue black, black, metalized black, olive, and at length, becomes gradually effaced until complete reduction of the chloride to the metallic state.

If the negative presents great opposition between the extreme tints, the exposure to light should not be pushed too far; as soon as the details become somewhat marked in the clear parts, arrest the luminous action. If on contrary, there be too great opposition, the process of reduction should be pushed very far, so that the whites of the proof may attain the marked blue tint.

Sec. V. *Fixing and coloring the positive.*—Into a gutta percha dish, pour about a centimetre in depth of filtered rain water. The positive on withdrawal from the printing frame is to remain completely immersed in this bath for about ten minutes. Stir the liquid so as to dissolve the excess of nitrate of silver which sticks to the picture. The proof will come up beautifully and take a very warm tone.†

The proof is then put into fresh water to free it entirely from the nitrate of silver used in sensitizing. After having allowed it to drain, lay it for about 20 seconds at the most, on a bath of acid gold:

Distilled Water	1000	grammes.
Chloride of Gold	1	"
Hydrochloric Acid	10	"

On removal from this bath, the proof is carefully washed to remove the hydrochloric acid, of which not the slightest trace must remain. The picture has then assumed a bluish color. To fix it, it is then immersed in the following hyposulphite baths:

No. 1.	Filtered Rain water	1000	grammes.
	Hyposulphite of Soda	100	"
No 2.	Solution No. 1	1100	grammes.
	White Chloride of Silver	to saturation.	
No. 3.	Hyposulphite of Soda	250	grammes.
	Water	500	"
	Chloride of Gold	1	gramme.
	Water	500	"

Mix together these two solutions, taking care to pour the chloride of gold in small quantities at a time into the hyposulphite.‡

The first solution gives a yellow color to the proof, which becomes lighter the longer the action is prolonged; the second gives it an extremely rich blue color; and lastly, the third gives the picture a magnificent violet tone. The proofs should generally remain several hours in these baths to remove the unchanged chloride of silver; we may know that the picture is fixed when the tint, when viewed by *transparency,* appears feeble, but by reflection presents extreme vigor.

If after fixing in the preceding hyposulphite baths, blacker tones should be desired, the proof, after being washed in several waters, must be placed in a bath of gold:

Distilled Water	1000	grammes.
Fordos and Gelis' Salt of Gold	1§	"

The proof must remain several hours in this bath; a magnificent black proof is obtained in this way.

The preliminary operation of washing is of the greatest importance, for if a proof still saturated with nitrate of silver is immersed in a bath of old hyposulphite, a hyposulphite of silver will be formed in the substance of the paper,|| passing to the

* The bath of silver made colorless by animal black, has the property of dissolving albumen, we must therefore be careful in having recourse to this method.

† The waters arising from these baths, should be carefully preserved in a large vessel. The silver may be collected by pouring in hydrochloric acid. Wash the precipitate of chloride of silver which is formed, and if we wish to transform it to the metallic state, reduce by hydrogen.

‡ In this reaction, chloride of sodium is formed, a double hyposulphite of soda, peroxide of iron, and a bisulphuretted hyposulphate (or tetrathionate S_4O_5) of soda.

§ It is better to use a mixture of—

Wat.r	500	grammes
Hoposulphite of Soda	4	"
Chloride of Gold	1	"
Water	600	"

taking care to pour the gold into the hyposulphite.

|| Hyposulphite of silver decomposes into sulphuret of silver and sulphuric acid. The latter acts upon the hyposulphite of soda to form sulphate of soda and hyposulphurous acid. Now, hyposulphurous acid decomposes most readily in sulphurous acid and sulphur. It is probable that it is this latter substance which attacks the proof rather than the

sulphuret state, which in the course of a few months swallows up the whites, and the destruction of the proof becomes manifest by the appearance of large yellow stains. The paper must therefore be washed more carefully in the first instance, so as to present to the hyposulphite only chloride of silver, which it readily dissolves.

The design of the second operation is to preserve the mezzotints from the dissolving action of the hyposulphite; then a strongly colored negative gives a positive in which the blacks reach the olive color before the details are scarcely marked. If we immerse the proof directly after washing into the hyposulphite bath, the latter will attack equally all the parts, so that the smallest details of the whites would be effaced. But the chloride of gold renders these minute details almost unchangeable without exercising this action on the blacks; the hyposulphite then discloses the latter leaving the whites intact. This explains the remark we made in another place. We obtain in this manner the means by which the defect of the negative is corrected. This solution possesses moreover, a second advantage, that of giving a magnificent tone, especially with a hyposulphite bath surcharged with chloride of silver. We must be careful however, not to immerse too many proofs at once in such a bath, otherwise we will have a disengagement of sulphurous acid, which, it is true, will produce a fine color, but which in a certain time would not fail to change the picture.* Black flakes of sulphuret of silver deposit in the bottom of hyposulphite bottles, which must from time to time be removed by filtering.

In a negative which does not present much opposition between the extreme tints, the proof may be passed directly after washing, to a fresh hyposulphite bath and left ten minutes, and then immersed without washing into an old hyposulphite bath. This gives a very rich coloration. After having perfectly washed the proof, we may turn it to a violet black tone with Fordos and Gelis' gold bath.

Lastly, in whatever bath the proof may have been, it is of the first importance that it be left in a plentiful bath of water for 24 hours, which should be changed five or six times, to remove every trace of hyposulphite. It should be left a couple of hours in a bath of filtered rain water and let it drain into a very clear solution of bichloride of mercury. If the latter becomes disturbed and loses its translucidness, there is still hyposulphite in the proof, and the washing must be continued; it is only by fulfilling these requirements, that we can obtain unchangeable positives.

The coloration of the proofs depends on the composition of the hyposulphite bath, which in a certain extent will collect tetrathionate of soda.† The salts of gold recommended by M. Legray, possess a marked advantage in the production of beautiful proofs, but as it is not gold by itself that produces this effect, perchloride of iron may be substituted for chloride of gold.

We extract from the English journals that portion of the remarkable work of Mr. Hardwich, relating more directly to photography.

Solution No. I.

Solution of perchloride of iron......	47	grammes.
Hyposulphite of soda.............	250	"
Distilled water..................	470	"
Nitrate of silver.................	5·2.	"

First dissolve 250 grammes of hyposulphite of soda in 405 grammes of water, then add the perchloride of iron solution, keeping the mixture in continual motion. The percholride of iron first gives a purple color to the liquid, but this soon vanishes. When the liquid has become colorless, which occurs in a few minutes, add 5·2 grammes of nitrate of silver dissolved in the 65 grammes of water remaining.

These different solutions amalgamate without giving rise to a precipitate of black sulphuret of silver.

This coloring solution may be used twelve hours after its preparation, but it gives better results after the expiration of a few days.

In the reaction which takes place, the perchloride of iron passes to the protochloride state; If we add an alkali a green precipitate of carbonate of iron is formed, which, absorbing oxygen, passes at once to the red peroxide state. It may be thought that an analogous decomposition might take place in the substance of the paper and attack the picture, but this effect is never produced in the experience of the author.

We may obtain the solution of perchloride of iron in different ways. It is prepared by boiling for a quarter of an hour 62 grammes of hydrochloric acid diluted with its volume of water, and 10 grammes of peroxide of iron (English rouge) let the solution cool and then filter, it is then ready for use.

Formula No. II.

Iodine......................	3·55	grammes.
Hyposulphite of soda.........	250	"
Water......................	500	"
Nitrate of silver..............	3·25	"

Take 8 grammes of the 250 grammes of hyposulphite of soda mentioned in the formula, and dissolve in 60 grammes of water. Throw the iodine into this solution and shake the liquid until all the iodine has disappeared. (If the mixture be colorless, it would show an excess of hyposulphite, and iodine must be added until the liquid assumes a light brown tint.) Then add 5·8 grammes of nitrate of lead dissolved in 60 grammes of water; an abundant precipitate of yellow iodide of lead is formed, which is separated by filtering, and is then washed with the remaining 380 grammes of water, to remove all the tetrathionate of soda.

Then add the remaining hyyosulphite of soda (242 grammes) and the nitrate of silver to the filtered liquid.

This formula being rather complicated, should be followed with precision; it may, however, be rendered more simple by adding the iodide directly to the hyposulphite, and omitting the precipitation of the iodine by the salt of lead. In this way, however, the proof will take a yellow tint, because iodide of sodium being in the liquid at the time of immersion of the proof on removal from the printing frame, iodide of silver will form in the substance of the paper The presence of an iodide, too, greatly lessens the dissolving properties of the hyposulphite. The coloring and fixing bath prepared with iodine, does not possess as energetic properties as the preceding bath (formula I) but it has the advantage of being free from every foreign metallic salt.

These two solutions may be used either acid or neutral, according to the color designed. To neutralize them, throw in a few pieces of very pure slack lime, let it rest about two hours and filter. If these baths, however, give good results when they are acid, they should only be neutralized when they have lost their excellence. Sometimes these liquids give the picture a yellow color; this defect may be corrected by employing them neutral, and by adding 1 gramme of chloride of silver, to 100 of liquid.

THE HALLOTYPE.

New York, 94 *Duane st., July* 9, 1856.

H. H. Snelling, Esq.—I have read with considerable surprise, the editorial of your last issue in relation to an alledged new kind of photographic picture, which you have named Hallotypes.

I trust, sir, in justice to myself and many intelligent friends

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sulphuret of silver. It will be seen that these reactions are complicated, and present vast matter for experiment.

* Hyposulphite of soda transforms chloride of silver into sulphuret, unchangeable by light, but if we immerse too many proofs at once in an old bath surcharged with salts of silver, hydrochloric acid may form which decomposes hyposulphite of soda and frees sulphur. It is the latter substance which seems to be the cause of the destruction of the proof.

† The persalts of iron and copper, also transforms hyposulphite of soda into tetrathionate.

who agree with me, you will not hesitate to publish this our respectful protest.

We consider the pictures in question as identical with those introduced about one year since, under the name of Chemitype. We are not able to discover in the "Hallotype," any useful alteration or variation in the original process.

For proof of the position we hold, may I take the liberty of referring your readers to myself personally, or to my Journal of the 1st of August, where will be found a full history of the whole affair. I remain, very respectfully, yours,

Charles A. Seely.

ETCHING DAGUERREOTYPES.

Soon after the beautiful photographs of Daguerre became public, attempts were made to engrave or etch the impressions so produced. Dr. Berres of Vienna was the first to publish a process for etching Daguerreotypes, his process consisted in covering the plates with the mucilage of gum Arabic, and then immersing them in nitric acid of different strengths.

In 1841, Professor Grove made known a method of etching Daguerreotypes by means of electricity. The plan he adopted was to make the Daguerreotype the anode of a voltaic combination, in a solution which did not of itself attack either silver or mercury, but which, when electrolized, would act on the metals unequally. The solution used was dilute hydrochloric acid. As this process is fully described in the valuable little manual on Electrotype Manipulation, by Mr. V. Walker, we need do no more than merely refer to it.

M. Figeau, of whom we have already had occasion to speak, likewise discovered a process for the engraving of Daguerreotypes; and founded on the belief that the lights of a daguerrean plate consist of unaltered silver, while the darks of the shadows consist of mercury or an amalgam of mercury with silver. He finds that a compound acid consisting of a mixture of nitric, nitrous, and muriatic acids, or of nitric acid mixed with nitrate of potass and common salt, has the property of attacking the silver in presence of the mercury without acting upon the latter. Bichloride of copper answers the purpose also, but less completely.

When the clean surface of a Daguerrean plate is exposed to the action of this menstruum, particularly if warm, the white parts of the lights are not altered, but the dark parts are attacked, and chloride of silver is formed of which an insoluble coating is soon deposited, and the action then ceases. This coat of chloride of silver is removed by a solution of ammonia, and then the acid applied again, and so on, until the depth of *biting in* is sufficient. However, it is not possible, by repeating this process to get a sufficient force of impression; a second operation is required, in order to obtain such a depth as will hold the ink, to give a dark impression; for this purpose the whole plate is coated with drying oil; this is cleaned off with the hand exactly in the way a copper-plate printer cleans his plate. The oil is thus left in the sinkings or dark bitten in part only. The whole plate is now placed in a suitable apparatus, and the lights or prominent parts of the face are gilt by the electrotype process. The whole surface is now touched with what the French engravers call the "Resin Grain," (*graine de resine*) a species of partial stopping out, and is at once bitten in to a sufficient depth with nitric acid, the gilding preserving the lights from all action of the acid. The resin grain gives a surface to the corroded parts suitable for holding the ink, and the plate is now finished and fit to give impressions resembling acquatint. But as silver is so soft a metal that the surface of the plate might be expected to wear very rapidly, the discoverer proposes to shield it by depositing over its whole surface a very thin coat of copper by the electrotype process; which when worn may be removed at pleasure down to the surface of the noble metals beneath, and again a fresh coat of copper deposited; and so an unlimited number of impressions obtained without injury to the plate itself.

TO MAKE PHOTOGRAPHIC PAPER.

Photographic paper to meet all the requirements of the Art, must be perfectly homogeneous in all its parts—the texture very fine and close, and perfectly free from spots or mineral matters. The best sizing is that of starch, which must be prepared in the following manner. Take—

Distilled water	3 pints.
Washed rice	4 oz.
Pure isinglass	½ oz.

or larger quantities in proportion. Boil them in a glass or porcelain vessel, filter them through clean cloth. The boiling must be continued only until the grains of rice begin to break, and stopped before the water is thickened by excess of starch. Take that portion of the liquid which has become perfectly clear by repose, and spread it over the paper in the same manner as other size. Great care must be taken in the manufacture of this paper, as the least particle of any mineral substance renders it worthless.

Personal & Art Intelligence.

— Our present number follows our last so closely that, our subscribers must excuse us for the want of material in this portion of our Journal. No event of any moment has transpired for us to record, unless we can by a stretch of the imagination, so call the announcement of the publication, in book form, of Hill's long talked-of "Hillotype process." This event has taken place, and Mr. Hill promises to impart his great discovery, in book form, to each and every one who will send him twenty-five dollars. This leads us to answer the queries of

— Messrs. Nicholson & Thompson.—A question rather difficult to answer under existing circumstances, as we have not yet been permitted to see either the pictures or the book; but from the confession of Mr. Hill in his last circular, that he has been wholly unable to perfect the discovery, and now finds himself obliged to throw it upon the public in its imperfect state—at the same time endorsing the opinion we gave four years ago of his incapacity to perfect the process—we should judge it would be rather hazardous, in a practical point of view, to invest twenty-five dollars in the invention with the expectation of realizing any immediate benefit from it. Of course, every one is a better judge of his ability to perfect the invention, so as to make it available to his purposes, than we are, and we consider it dependent upon such ability to be made practical.

— Mr. W. C. North has sent us a specimen of Mr. Willoughby's new style of colored ambrotypes, and we should judge from this that the process is capable of very delicate and artistic manipulation, in the hands of a skillful artist. The specimen before us is the result of a first attempt, and it shows that a very little practice on the part of the artist, would enable him to produce very fine pictures, and convinces us that it is easily executed, and therefore is well adapted to the abilities of the majority of the ambrotype artists. The effect is quite pleasing, and will undoubtedly be popular among a large class of our people. We, however, must express the opinion that it resembles very closely many of the colored ambrotypes which have been on exhibition in this city for several months. Mr. North has the disposal of rights—for we believe it is patented, from what he writes—for the New England States, New York, Pennsylvania and Maryland. Those desirous of learning the process, can address him at Mansfield, Ohio.

— We clip the following from a Utica paper. We have not seen any of Mr. Davie's photographs; but if they in any measure compare in taste and finish with his daguerreotypes the praise is well deserved, and from his known ability we cannot doubt his pictures are all that is claimed for them:—

Portraits and Photographs—Mr. D. D. T. Davie, is now producing at his rooms in the Devereux Block, Painted life-size Portraits, and Painted Photographs of a superior quality. He

has employed experienced artist to aid his skill, and can now confer life to the canvass, and copy to a line the "human face divine," and present a *perfect picture.* We are not a judge of the mechanical execution of a portrait: but we can tell when a copy is true to the original, and we have seen none more so than the specimens now in the rooms of Mr. Davie.

— The *Mobile Advertiser* gives us pleasure by recording the following of a most deserving and skilful artist:—

The Ambrotype Process—*Great Improvement in the Daguerrean Art.*—The great discovery of Daguerre, that shadow could be seized and held in captivity by art; that the Sun himself could be made to trace the desired image upon the plate prepared for it, almost staggered human credulity, and has produced most striking results. Not twenty years ago, the slow and expensive process of the brush, the canvass and easel, was the only means of portraiting the lineaments of "the human face divine." Such precious mementos of family and kindred, were attainable only by the wealthy and prosperous, and even then, the most accomplished artist would fail in conveying to the waiting canvass a correct representation of his sitters. The invention of the daguerreotype soon wrought a wonderful change. The sun light could not fail to cast a correct shadow, and it remained for art to catch and retain it, for social gratification. At first the process was, naturally enough, imperfect, and the expense considerable, but improvements have been rapidly making, until it has attained a point beyond which there really remains but little to be desired. The facility, skill and cheapness with which likenesses are now taken, have exerted a wonderful influence upon society. Everywhere we meet with images of absent and loved ones—interchanging likenesses between parting friends has become one of the commonest of events; children going from home must leave behind the deguerreotype and carry away the "counterfeit semblance" of fond and respected parents; mother must see how baby looks in a picture; true love must be fed in absence with the light of these faithful reminders; in brief from the proudest mansion of the rich to the humblest home of poverty, it were strange not now to find the daguerreotype likeness of some loved and cherished object dead or living. In this view it is impossible to estimate the amount of public benefit the Daguerrean art has already accomplished.

Our thoughts are directed into this channel from having passed an hour, yesterday, very agreeably in the Daguerrean Gallery of Mr. C. Barnes, Dauphin street, where we learned something of a great improvement in the art, which he has recently introduced in this city. Mr. Barnes, we believe, was the pioneer here in daguerreotyping, and his great success is evidence of his superior merit as an artist. But highly successful as he has been in taking daguerreotype likenesses proper, we think he is destined to achieve more satisfactory triumphs by the ambrotype process. The ambrotype is taken upon glass, and requires a very different preparation of chemicals from the daguerrotype, which is taken on silver. The likeness is caught in the same manner however, though the time in sitting is perhaps a little less. Its great improvement over the daguerreotype consists in the prominence and distinctiveness of the likeness, which can be seen clearly in any shade of light—and the superior richness it gives to drapery. We examined several pictures at Mr. Barne's, that more resemble exquisite paintings than the ordinary dagnerrotype and are very beautiful. Another advantage of the ambrotype, is its greater security from the intrusion of dust, which in time defaces so many, even of the most carefully prepared daguerrotypes. The preparation and finishing of the glass plate precludes the possibility of injury of this sort. It is claimed too, that ambrotypes will never fade or oxydize—that neither water nor acid will affect them, and therefore they must be as nearly imperishable as anything of human manufacture can well be. We advise our friends to visit Barne's and examine his specimens—we may say, too, that he has the assistance—which in this process is quite desirable—of a skilful and practiced operator, who has given much attention to ambrotyping, and is withal a very good daguerreotypist. What Mr. Barnes and his assistant Mr. Wiley, cannot do in this line, nobody else need attempt, at least in this region.

Our Illustrations.—The first is a portrait of the Rev. Rob. R. Raymond, Professor of the English Language and Literature, in the Collegiate and Polytechnic Institute of Brooklyn, N. Y. The negative is from the *attelier* of Messrs. Barnard & Nichols, of Syracuse, N. Y., whose rapid progress in the true mastery of this difficult art, has stamped them men of true genius. The faults in this picture are entirely due to the printing, as the negative is a very excellent one. The second picture gives an accurate view of the ruins of Mr. E. Anthony's factories after the fire of the 28th of April. These negatives were taken the day after the fire, during a dark drizzly rain, and therefore did not print as clear as we should have wished. Although, by this fire, Mr. Anthony suffered a total loss of his engine and all his manufacturing apparatus and material, besides a large quantity of cases and photographic apparatus, his energy and perseverance enabled him to put up, in complete running order, another engine, within ten days after the conflagration, and in two weeks his factories were again in full operation, so that he is now fully prepared to fill all orders in the most prompt and efficient manner.

— We would call attention to the advertisement of Mr. Bisbee on our cover. Also to that of "An experienced operator."

— Mr. Glosser gave us a very unexpected pleasure a few days since, in permitting us to examine some exquisite plain photographic portraits. The toning, which we consider the most difficult part of photographic printing, was exceedingly rich, warm and clear, while the outlines were round and full, and the shading in fine harmony with the lights. The artist is fully displayed in these pictures, and we regret that we have so long permitted so talented an artist to escape our notice. Mr. Glosser is with Mr. S. Root, of whose ability as a daguerrean the world is well aware.

Mr. Vannerson has several very excellent photographs lying before us, and his improvement has kept pace with his contemporaries. His picture of the "Veterans of 1812 at the Tomb of Washington," is, considering the circumstances under which it was taken, a little gem.

Messrs. Whipple & Black have sent us several very fine negatives for future numbers of the Journal, for which they have our thanks.

— G. B.—You cannot regret more than we do the necessity which *compelled* us to insert the "Apology" and its reply. Had we received *an apology* based entirely upon the facts of the case, we should have published it without comment; but a man must not put a whip into our hands with which to lash ourselves, without first measuring it and feeling sure that the most effective part will not reach himself. We sought not the battle, but having been forced into it, we shall endeavor not to come off second best.

NEW PUBLICATIONS.

A Manual of Photographic Chemistry; by T. F. Hardwich, 2nd American from the 2nd London edition: 278 pages, 12mo., price 50 cents; H. H. Snelling, 93 and 95 Duane-Street New York

This admirable Photographic work has reached its second edition, greatly improved over the first. Mr. Hardwich has revised it with great care, and made several very important alterations and additions. There is no work extant more valuable to the Photographist.

Photography on Collodion, Translated from the French of D. Van Monkhoven; by W. Grigg, Esq, 62 pages, 12mo., price 50 cents. H. H. Snelling, Publisher.

This work has met with deserved success in France. It is undoubtedly the clearest and best treatise on the collodion process ever written. We have seen some of the results derived from its formulas, and can pronounce them exceedingly fine.

We shall also soon issue reprints of Sutton's Calotype Process, and Hennah's Collodion Process. We have a few of the English edition of the latter on hand.

Hon Millard Fillmore.

NEW YORK ARTISTS.

BY AN OLD CONTRIBUTOR.

So little has recently been said or written about our own artists of America, that the following, from the *Knickerbocker Magazine* (the gem of American Magazines), comes to our mind with a freshness, and feeling of pleasure, even as the sweet perfume of a fresh blown rose to our nostrils.—Ed. *P. & F. A. Jour.*]

Reader, did you ever spring into an omnibus at the head of Wall street, with a resolution to seek a more humanizing element of life than the hard struggle for pecuniary triumphs? Did you ever come out of a Fifth-avenue palace, your eyes wearied by a glare of bright and varied colors, your mind oppressed with a night-mare of upholstery, and your conscience reproachful on account of an hour's idle gossip? Did you ever walk up Broadway, soon after meridian, and look into the stony, haggard, or frivolous countenances of the throng, listen to the shouts of omnibus-drivers, mark the gaudy silks of bankrupts' wives, and lose yourself the while in a retrospective dream of country-life, or a sojourn in an old deserted city of Europe? A reaction such as this is certain, at times, to occur in the mood of the dweller in this kaleidoscope of New York; and as it is usually induced by an interval of leisure, we deem it a kindly hint to suggest where an antidote may be found for the bane, and how the imagination may be lured, at once, into a new sphere, and the heart refreshed by a less artificial and turbid phase of this mundane existence. Go and see the artists They are scattered all over the metropolis: sometimes to be found in a lofty attic, at others in a hotel; here over a shop, there in a back-parlor; now in the old Dispensary, and again in the new University: isolated or in small groups, they live in their own fashion, not a few practising rigid and ingenious economies, others nightly in *elite* circles or at sumptuous dinners; some genially cradled in a domestic nest, and others philosophically forlorn in bacheloric solitude. But wherever found, there is a certain atmosphere of content, of independence, and of originality in their domiciles. I confess that the ease, the frankness, the sense of humor and of beauty I often discover in these artistic nooks, puts me quite out of conceit of the prescriptive formalities of Upper-Tendom. Our systematic and prosaic life ignores, indeed, scenes like these; but the true artist is essentially the same everywhere—a child of nature, to whom "a thing of beauty is a joy for ever;" and therefore a visit to the New York studios cannot fail to be suggestive and pleasing, if we only go thither, not in a critical, but in a sympathetic mood.

Many of our cherished artists—Allston, Greenough, and Cole, are no more: many, like Doughty, have in a great measure retired from public view, and not a few are abroad. Powers is at Florence, executing his unrivalled busts: Crawford is at Rome at work on the Virginia monument, the horse for which was cast not long ago at Munich, and won enthusiastic admiration: while the statues of Patrick Henry and of Jefferson, already at Richmond, are acknowledged master-pieces: the Beethoven, too, now in Boston, proved a complete triumph: Paige, called the modern Titian, is deemed there the greatest of portrait-painters; Chapman, his neighbor, is etching Roman peasants in a manner no one can excel: Freeman, near by, is studiously evolving a masterly work, and Thompson has made the most perfect copy of the Beatrice seen for years; while Ives models better than ever, and Miss Lander handles the clay and modelling stick with progressive aptitude and high promise.

One of the most familiar faces among our Roman artist-friends may be seen triennially in our own busy thoroughfares, and not seldom at an evening party "up-town." Terry seems to have preserved intact his native ways amid the vagaries of Italian life: the same kindly, sensible fellow as if he had never thrown *bon bons* at the Carnival or joined in the chorus at a pic-nic at Ostia. He was ever an attentive cicerone to his countrymen, and especially, country-women; and now that he has re-established himself in a handsome studio of the Eternal City, very comfortable are his artistic receptions, where rides to the Appian Way, a party to witness the illumination of St. Peter's, or join in a ball at Torlonia's, are talked over by fair visitors to their hearts' content. Weir is at West Point, every now and then sending to Williams and Stevens, a domestic or religious picture marked by a Flemish exactitude of detail, a fine disposition of light and shade, or an attractive tone of feeling. Morse has put his artist fire into a locomotive shape, and writes with electric fluid instead of painting in oil. His last picture hangs in the drawing-room of "Locust-Grove," his beautiful domain on the Hudson; and while it testified too much skill and feeling for the lover of art not to regret his withdrawal from the field, it also symbolizes the domestic enjoyment, which with science and a great public economy, now more than fills the deserted sphere of his youth: it is an admirable full length portrait of his daughter. Leutze is busy upon American historical subjects, at Dusseldorf; and his grand picture of "Washington crossing the Delaware" keeps his memory green in the hearts of his countrymen, through the widely-distributed engraved copies. Mount is at his home on Long Island, but doubtless will have ready one of his inimitable reflections of humble or humorous life for the next exhibition. Rossiter* has been at work on a large scriptural picture at Paris; and Pearse Cranch is there engaged on landscapes, occasionally weaving a poem for the *Crayon*, or his friend Dwight's *Musical Journal.* Hunt's peculiar talent, so long the delight of his friends at the French capital, will, it is hoped, derive new inspiration from his bride. May varies his studies here by occasional trips to England, where he turns the more lucrative branch of portrait to good account. H. K. Brown, whose studio is in Brooklyn, L. I., has been for many months absorbed in his Washington statue. G. L. Brown was last heard of at Lake Albano, gathering materials for an elaborate Italian composition: and Ingham reappears occasionally in his pristine fame, to the admirers of high and dainty finish, in the shape of his lovely "Flower-Girl." Duganne, though lately interrupted by illness, models, draws, writes, and teaches indefatigably and efficiently as ever. Cheney goes about making his matchless crayon-heads—a branch of portraiture more and more in vogue, and one in which Miss Stebbins,† Darley, and Collyear have gained of late some enviable laurels. Baker's excellent portraits are in constant demand, and Cole's beautiful legacy, the "Voyage of Life," has just been engraved in the best style. But space will not allow us to expatiate upon all the individuals who honor and illustrate artist-life among us, and, for the present, we must glance in at the New York studios, and renew our subject when more scope is allowed for a theme so broad and delectable.

My visit to the President of the Academy was repaid by an agreeable surprise. I found in his studio, beside the familiar trophies of his progressive career, two new and original pictures embodying phases of nature such as he has never before so distinctly put upon canvass, and the masterly execution of which attests the steady advance inevitable with such principles of art as guide the pencil of Durand. One of these was a group of forest-trees, standing in their native individuality, and unassisted by any of those devices which are usually introduced to set off so exclusively a theme. Only the great skill and truth of their execution would atone for the paucity of objects in such a landscape. Yet so characteristic is each tree, so natu-

* Just returned under most afflicting circumstances.
† Sailed for Europe in May.

ral the bark and foliage, so graphic the combination and foreground, that the senses and the mind are filled and satisfied with this purely sylvan landscape. Mark the speading boughs of that black birch, the gnarled trunk of this oak, the tufts on yonder pine, the drooping sprays of this hemlock, and the relief of the dead tree—is it not exactly such a woodland nook as you have often observed in a tramp through the woods? Not a leaf or flower on the ground, not an opening in the umbrageous canopy, not a mouldering stump beside the pool, but looks like an old friend: it is a fragment of the most peculiar garniture that decks the uncleared land of this continent. In an English gallery it would proclaim America. How Evelyn, Michaux, Audubon, or Bryant would hail it with loving eyes! Its unexaggerated, simple, yet profoundly true expression, shows how the genuine artist can effect wonders without adventitious means. In another painter's hands it would prove but a sketch; in Durand's it becomes a landscape; and one of the most fresh and vigorous he has ever made. Not less remarkable, although in a diverse way, is that view of mountains and a lake during or just before a thunder-storm. The deep shadow that is cast by the black cloud, while it falls opaquely over a portion of the scene, is diversified by a faint, tremulous light in the lap of the hills, while farther off hangs a bluish mist—the effect of partial sunshine and a patch or two of blue sky: many a time have we witnessed such a magical result of dense, over-hanging vapor suddenly casting a pall over the Hudson, on a bright summer day: the transient character of the elemental phenomena renders their successful transfer to canvass more impressive: we seem to behold the change itself instead of a moment of its proeess: the details of the landscape are faithful, and the transition wrought by the gust is at the same time caught and fixed. In these pictures two of the most difficult points in landscape painting are accomplished; the trees look real, and the chiaro oscuro of nature are reflected: the evanescent is staid by the limner; a rare observation and a poetic sense have ravished from the picturesque its most effective traits. A work of singularly pleasant associations as well as of characteristic beauty has just received the final touches of this artist's pencil. Two or more years since, an English gentleman, Mr. Graham, left the sum of five thousand dollars to establish a school of design in Brooklyn, (L. I.) A part of the interest, it was provided, should be expended annually for the purchase of a picture by an American artist, and thus a gallery instituted. Mr. Durand was applied to, and, in order to recognize this admirable precedent for the improvement of local taste and the encouragement of native art, he cheerfully agreed to execute a large work for the Association, at a price merely nominal in comparison with the usual remuneration and actual market-value of his landscapes. His sympathy with the object is manifest in the elaborate care and graceful feeling exhibited in this beautiful scene. In the back-ground rise mountains, whose American character is evident both in the shape of their summits and the tints that clothe the most distant in blue mist, and the nearer in clear day-beams falling on umbrageous declivities: a stream brawls in the foreground, and, amid the rough timbers of a clearing, is a settler's log-hut approached by a rude path, near which runs one of those primitive boundaries called a snake-fence: between the woods and the domicil a large field of ripe grain lifts its mellow and waving tufts to the sun-shine, and, at its edge, stands the gleaner about to swing his sickle through the golden ranks. The details of the picture are worthy of its genial conception; bark, moss, stone, leaf, spire of herbage and hue of cloud, wear a genuine look; the ridges of the hills recall the White Mountains; the trees are indisputably those of an American forest, and over all broods the modified glow of the ripened summer. This landscape rejoices in the felicitous name of "The First Harvest," applicable both to the scene itself and the circumstance that it initiates the national collection of a judicious benefactor of art, whose name the painter has gratefully inscribed on one of the rocks in the foreground.

Of all young painters, Huntington gave the most emphatic promise of that religious sentiment which embalms the names of the old Italian masters. His "Dream of Mercy" breathed the holy effluence that so instantly excites veneration and tenderness. He has paid a visit to England recently, and made some fine portraits of church dignitaries; and, since his return, having been mainly occupied with likenesses which are claimed as soon as finished, his studio contains, at present, but few specimens of art. I was, however, delighted with four noble studies which he made in Paris, with a view to his picture of "The Good Samaritan:" this painting awaits the completion of the private gallery which it is destined to adorn, and, in its absence, it is interesting to examine these studies. They consist of two male and two female heads: the originals are rare models, worthy a painter's devoted attention: and Huntington seems to have transferred them to canvass not only *con amore*, but with the most elaborate fidelity. Such relief, strength, expression, and color could only result from vigorous and earnest limning: seldom do we see four more effective and individual heads; there is the greatest degree of artistic significance in the details and general effect; they show that Huntington's powers have vast latent force, and that he is capable of greater things than he has yet achieved; only will and inspiration are needed by a man who can so command the elements of art, to realize the highest conceptions. Bishop McIlvaine's portrait is a fine work: it has great reality and an excellent tone.

Now let us step into the room of a young Italian who has but lately set up his easel in New York. He is from the most prosperous and liberal of the continental states, a Sardinian. He has studied painting in the gallery of Turin. Whoever has visited that collection will remember it by the glorious Murillo it boasts—representing Homer with sealed eyes and a laurel crown—one of the most truthful and characteristic works of the gifted Spaniard. Signor Angero excels in cabinet portraits; several excellent ones of well-known residents among us, attest the fidelity of his pencil. His flesh-tints are very good; and some of his studies from the old masters, suggest great insight. His style is likely to be popular; and may success attend the intelligent young artist who has come to test his fortune among us.

In contrast with this mercurial son of the South, let us turn to a young Dane whose pale and earnest face has affinity with his ideal countryman whom Shakspeare has immortalized. Wenzler is as devoted a student of art as is to be found in this metropolis. His standard is high, his zeal unremitted. In spirit he is kindred with the most self-devoted of his profession. No one has painted more exquisite miniatures, with such lovely flesh-tints, such fine drawing, and delicate color. They remind us of the *chef d'œuvres* of that branch of the art, hoarded in the caskets of beauty and worn on the bosom of affection. His last triumph in a department of art where mediocrity is so common and the highest success rare, is a portrait of the highly-endowed and deeply-lamented son of our respected fellow-citizen, Dr. Francis; although dependent on a daguerreotype and his affectionate memory alone, so perfect in expression, so life-like in lineament, so characteristic to the minutest detail, is this beautiful work, that we feel, as we examine it, that love inspired what genius conceived, and thus re-produced the living image so endeared, to console hearts otherwise indeed bereft of all but the memory of his nobleness and his worth. The oil portraits of this artist have won great admiration for the extreme reality of their details and for their excellent drawing: in tone and hue they have been more experimental, and therefore less satisfactory; but in landscape, two or three specimens have borne evidence of deep study and remarkable truth of effect: they have arrested the eye, when exhibited, and excited high anticipations of his future career. Wenzler's characteristic as a votary of art, is earnestness; and he has seized, with great tenacity and precision, certain elements of painting. It is needless to add that such a spirit and attainment render him an object of peculiar interest, as destined to work out and realize a true ideal. The variety and faithfulness of Kensett's* studies of landscape may be learned at once by the sketches on the

* Embarks for England this month, to sketch among the Lakes of Cumberland.

walls of his room. The traveller recognizes localities at a glance. One of the marked excellencies of this artist is the truth and definite character of his outline: accordingly we behold a fragment of the Appenine range, an Alpine peak, and the more rounded swell of American mountains, in these artistic data for elaborate works. Careful observation is the source of Kensett's eminent success. He gives the form and superficial traits of land and water so exactly as to stamp on the most hasty sketch a local character indicative of similitude. His landscapes would charm even a man of science, so loyal to natural peculiarities is his touch and eye. Equally felicitous in the transfer of atmospheric effects to canvass, and with a genius for composition, scenery is illustrated by his fertile and well-disciplined pencil with rare correctness and beauty. In rocks he is especially effective. Every material that goes to the formation of a landscape he appears to have carefully studied. We retrace, at ease, our summer wanderings, in his studio: there are the "Hanging Rocks" which bound good Bishop Berkeley's old Rhode Island domain; here a bluff we beheld on the Upper Mississippi; and opposite, an eagle in the gorge at Trenton where we watched the amber flash of the cascade. How finely is reflected the morning and afternoon light of early autumn in America, in these two charming pictures; there is Lake George itself; the islands, the shore, the lucid water; how native is the hue of yon umbrageous notch; and what Flemish truth in the grain of that trap-rock; how rich the contrast between the glow of summer and the colorless snow on the summit of the Jungfrau. The trees in this more finished piece, are daguerreotyped from a wood, with the fresh tint of the originals superadded. Any one who desires to carry to Europe a reliable American landscape should bespeak a picture from Kensett. If we may judge from the sketch, the view of Niagara for which Lord Ellesmere lately gave him a commission, will prove not only a satisfactory work, as conveying a just impression of the wondrous scene, but an honor to American art.

Opposite Grace Church is the studio of the Chevalier Fagnani, a Neapolitan artist who came to this country, if we mistake not, with Sir Henry Bulwer, by whom he is highly esteemed. We have seen various specimens of this accomplished painter's talent—fine original composition drawings, remarkable studies of the head and figure, etc.; but his great versatility of style and unusual success in characterization, have caused his time to be almost exclusively occupied in portraiture. When the subject is favorable, he gives a peculiar charm and interest to his likenesses; we recal, especially, two or three of his female heads in which the air, coloring, and general effect have been, in the highest degree, refined and artistic. Beside masterly portraits in oil, Fagnani makes admirable crayon pictures. Among his latest elaborate portraits is a composition, his own beautiful family grouped in most natural attitude, around a tuft of pond-lilies, on the edge of a stream: he has also recently finished a speaking likeness of President King, of Columbia College. He excels in children, seizing on their graceful outlines and glowing or delicate tints. He also excels in portraits, many of them of cabinet size, executed in colored pastels, in a way peculiar to himself: the finish, expression, and beauty of these works have made them so popular that the artist's time is quite absorbed.

There is, as usual, on Elliott's easel, a strong, richly-colored head in the process of completion: how true the lines, how effective the relief and contour, and with what nature the white hair rests upon the florid temple! There is not such a vigorous pencil among our limners; when an old man whose face is ploughed with the thought and cares of an adventurous life, and yet alive with the latent fires and marked with the strong will of robust maturity, sits to Elliott, the portrait becomes not only a noble likeness, but a grand study of character and of color. Laing has recently painted a beautiful full-length of a lady; he has a ready melo-dramatic talent, and his work is radiant with an enjoyable spirit. His studio exhibits a crowd of lovely children. Gignoux could almost allure a snow-bunting from the sky with his truthful winter landscapes. His imitative skill in detail is marvellous; and he has just sent to its fortunate owner an autumnal landscape that resembles a large daguerreotype caught and tinted in an American wild in the deepest flush of October. Richard M. Staigg is here in the winter season, to finish his roll of commissions begun in summer at Newport, his permanent home. His miniatures are in constant demand; he often succeeds in obtaining the best effects of oil-painting in these exquisite works; and is more uniformly successful in his likenesses on ivory than any votary of that delicate art. As a colorist, too, there is truth and freshness in his miniatures; those of Webster and Everett, engraved by Cheney, are the finest specimens of the kind yet achieved in this country; and Staigg has done artistic justice to some of the loveliest of American women.

We contemplate with peculiar interest the results of Church's recent visit to South America; although his stay was brief, such is the thorough New England industry and quickness of this popular artist, that he seized upon more hints for landscapes, and brought away a greater number of traits of scenery than a less spirited observer would acquire in a year. Some of these he has transferred and others is now transferring to canvas: one especially proved a novelty: it is the view of an extensive water-fall; the tropical vegetation, the long distance occupied by the broken cataract, and the singular formation and quality of the hills, make this landscape, in the literal style of Church, a very suggestive and remarkable picture. He has dealt with South American cascades as faithfully as with the flushed horizon of his native country, and we find a new mine of the picturesque opened by his graphic hand. Seldom has a more grand effect of light been depicted than the magnificent sun-shine on the mountains of a tropical clime, from his radiant pencil. It literally floods the canvass with celestial fire, and beams with glory like a sublime psalm of light. A butter-fly impaled under a glass in Church's studio actually scintillates azure; and when visitors question the authenticity of his brilliant tropical hues, he points them to his insect witness of nature's radiant tones in those latitudes. There is a resolute, progressive, and apt spirit in Church which gives a living interest to his landscapes, and fills the spectator with a sense of his rare promise in art. Edwin White has lately returned from Europe, and opened a study in the New York University, with ample proofs of careful studies; his pictures, however, have been distributed among their owners, and but a few remain in his studio: he has in hand a subject certain to be popular among the descendants of the pilgrims, "The Signing of the Compact in the Cabin of the Mayflower." To the traveller, however, who cherishes Italian memories, there is more of the poetry of life in his "Beggar-Child," who looks as if he had just stepped out from an angle of the Piazza d'Espagna or the shadow of Trajan's Column, so much of the physiognomy and the magnetism of the clime are incarnated in form, complexion, attitude, eye, and expression. Equally suggestive is the *Pifferini*, two of those picturesque figures that swarm in Rome at Christmas-time, and are indissolubly associated with her fêtes, ruins, and shrines; the elder leans against a church-wall, on which a half-obliterated ecclesiastical placard looks marvellously familiar, his peaked and broad brim hat set on his head in a way inimitable for its effect of shadow and grace, his luxuriant beard, velvet jerkin, effective attitude and meditative gaze, are precisely true to fact; at his side nestles a boy whose long tresses and large, pensive eyes, whose olive cheek and angelic smile remain indelibly stamped on the memory of all recent visitors to the Eternal City. We recognize in this beautiful urchin one of the "things of beauty," which the English poet, who died in Rome, has told us so truly "is a joy for ever;" the pilgrim's instrument is at his feet. How come back to the heart, as we gaze, the dreaminess, the sunny lapse in life's struggle in which it was our privilege to revel, and is now our delight to remember, as the most peaceful and brilliant episode of our days of foreign travel! These two figures, caught from the passive life of old Rome, typify it completely to the imagination, and touch the key-note of an ended song.

Here we are in the room of a representative of the English school (only to find him packing up for a migration to his kin-

dred's home in the South-west), an artist who painted Byron in Italy, and won the heart of Sam Rogers by his picture of Annette—the poor girl who watched in vain for her lover in Irving's sad and graceful story. It was at the epoch when that author was the favored guest in London; and we cannot wonder that, with such reminiscences, West* should cling to the subjects and the style then prevalent in England. He is loyal to Sir Joshua Reynolds, and elaborates composition portraits with the most patient care and tasteful study. An "Angel-Child" is very expressive and delicately treated: "Judith" is a gorgeous and effective piece of coloring and dramatic action; and several portraits, with beautiful costumes and accessories, attest the refined taste of the artist, and the number of lovely young friends who have sat and listened to his charming reminiscences while he, with glad patience, delineated their charms.

I found a "Winter-Scene" on Cropsey's† easel of both artistic and historical interest. A picturesque, shelvy mountain impends over a dell in the Ramapo valley; two or three cottages with snow-crowned roofs are grouped in lonely brotherhood; the white drifts on the shaggy and precipitous side of the cliff, the wintry sky, the unsullied expanse of the foreground, where a woman is crossing with a pail, a boy loitering with his sled, and a load of wood stands ready to be piled away, unite to form a landscape at once indicative of the season and the country: the tint of the frozen pool and the hue of the atmosphere are given with much truth to nature. In this vicinity Washington made his head-quarters during the fearful episode of our revolutionary struggle identified with Valley Forge: and from the summit of this abrupt and lofty mountain, he often gazed toward New York, thirty miles distant, visible on a clear day. With how many mouths of weary and intensely anxious vigil is that bleak and isolated observatory associated; and how vividly the terrible ordeal through which the scanty and famished army passed, re-appears to the mind while contemplating the scene in all its wintry desolation! An entire contrast is afforded by a view of Greenwood Lake. I knew it belonged to New Jersey from the character of the rocks, familiar to all who have wandered along the Passaic. In the umbrageous glen Cropsy has passed many a dreamy hour. His summer studio is near by. Another sketch is quite characteristic of the region: it represents an inundated valley over-grown with dead trees, whose huge, spectral limbs have a melancholy fascination. There is a spirited view of a gorge in the Catskills, wild enough to charm Salvator; a shivered tree hangs over a chasm, and down its sides of gray stone, half-hid by a thicket, a foaming cascade is dashing. Those familiar with the aspect of the Mediterranean coast, will recognize the cliffs, water, and sky of the Genoese territory in the masterly scene drawn from nature there. Cropsy intends revisiting Europe; and amateurs are quite secure of faithful landscapes who give him liberal commissions. That large canvass is outlined with an effective picture of the Roman Forum; every column and arch wears a grand yet familiar look, and recalls the delicious spring morning when I watched the snail-like excavators of these children's barrows and indolent motion, and the solemn nights when the moon glistened on architrave and frieze, and memory conjured back a triumphal procession or a Ciceronian discourse. But here is something nearer home: a beach with granite ledges and a high cliff—a seaward perspective and the green billows fringed with those majestic, graceful, half-transparent, and fair figures watching the beautiful scene; that curve of the shore, the mould of that rock, the outline of the cliff, are easily recognized: it is the favorite trysting-place of lovers, the delight of children on their afternoon walk, the goal of the Sunday evening promenade at Newport—the shore below the "Forty Steps." How many will gaze on this bit of coast-scenery with emotion. More than one poet has set there in reverie; more than one flirt been awed into momentary earnestness by the limitless expanse of wave and sky thence stretching before her fickle eye; and many a rosy-cheek urchin has gathered bright pebbles there and wet his little feet, while the nurse listened, forgetful of her charge, to an insinuating coachman. The place, too, has witnessed rare sport. My friend, the pastor, Isaac Walton, Jr. has landed on the slippery ledge many a giant tautog, and a less clerical fisherman grown profane as he jerked his broken hook from the clinging kelp, or waded through the advancing tide to dry land, with nothing but bait in his basket. I wonder not that the humorist who used to wake laughing echoes here with his bon-mots, set Cropsey to work in order to have the beach and its environment reflected by his truthful pencil. During this half-hour in Cropsey's studio, I have been lured to Rome, to the Catskills and the Passaic, to the Ramapo Valley and to Newport; and each locality, beside refreshing my eye with natural beauty, has wakened fond reminiscence. Now let us knock at the opposite door, and see what Hicks* is about. With the recollection of his miraculous escape from the hecatomb of victims that perished by the railway catastrophe at Norwalk, it was delightful to find this popular artist cheerily directing the pencil of his wife, another survivor of that tragic scene. What a contrast between their tasteful occupation and quiet studio, and the remembrance of that pitiless fate which overtook so many of their companions! Hicks is a fine colorist. Examine that head of a stolid burgher of Long Island, there is little in feature or expression for an artist to make effective. Yet this want is atoned for by the consummate skill with which the tints are disposed. One is reminded of Gilbert Stuart. Another point, in which success is rare, is obvious in that full-length, so well drawn and toned; the figure stands firmly and easily. How seldom can this be said of the portraits in the City Hall! Have you ever been to Trenton Falls? If so, you doubtless remember the landlord and his thriving family. Here they are very cleverly grouped together, one leaning against a tree, another handling his gun; one playful, another contemplative; and, in the back-ground, through a leafy vista, we have a glimpse of the rushing water: the likenesses are recognized at once; the attitudes are natural and well varied; and there is a pleasant moral atmosphere and unity of effect in the whole. Some fine heads adorn the wall, all full of character and several with exquisite flesh-tints: those of Halleck and Longfellow are remarkably good. Hicks well deserves the fame and the constant and lucrative occupation he has won as a portrait-painter.

From this busy limner, whose fresh array of pictures indicates that every passing hour brings its task, let us turn to a dreamer who lives in the past, because he is too ideal to clutch at the present. Yet if ever a man had the true artist feeling, the genuine sense of beauty and poetic conscience, it is John Cranch.† I know this from many a colloquy with him while strolling along the Sunny bank of the Arno, and through his acute and sympathetic comments in the Florence galleries. He used to make beautiful impromptu studies from Shakspeare. He has a keen perception of the humor and the sentiment of the poet, and could translate them daintily with pen or crayon. He is one of those artists who should live in Italy: the executive is subordinate in him to the imaginative. I found him copying a portrait: it was that of a genuine Italian woman:

> "Heart on her lips and soul within her eyes,
> Soft as her clime and sunny as her skies."

He was doing it for the love of the thing, wishing to preserve a memorial so characteristic. I remembered an old man's head, a Tuscan painter's beard, and other gleanings from that southern land; and there were books I knew at a glance came from a stall in the Piazza del Duomo, in Florence. There sat Cranch, intent on the fine outline of the handsome Italian, contentedly touching her great orbs of jet with light, and tinting her softly-rounded olive cheeks to a Fornarina richness: the same reserved, quiet, and genial dreamer as years ago in Italy; never satisfied with his achievements, full of sensibility to the claims and the triumphs of art, and apparently content to breathe the air made vital by its enchantments. Some of our wealthy lovers of Shakspeare should commission this artist to

* Recently gone to Tennessee, where his family reside.
† Sailed for Europe in May, with many commissions.

* Just opened a new and elegant studio near the Mercantile Library, Astor Place.
† Now established at Washington, (D. C.)

illustrate a scene: he would do it with zest and spirit. Several good portraits may be seen at his studio.

There is something in Gray's pictures that gives one the feeling of maturity, one of the most rare sensations of American life. A refreshing absence of the crude, the glaring, and the melo-dramatic lends a singular charm to his studio. Here is something like mastery; all is not experimental; and we feel the comfort of achievement instead of the unrest of endeavor. How clean are the outlines of his best heads and figures; no attempts at evasion, but so true and gracefully drawn as to gratify our sense of exactitude and completeness. Gray is what may be called a conservative painter: he does not sacrifice the enduring to the temporary. His subdued tints in such pleasant contrast to the gaudy hues prevalent in our streets and houses, attract the eye at once. They are mellow, and linger on the artistic sense as old wine on the palate: his *chiaro oscuro* is often exquisite, some of his portraits have the deep clear tone, and the high finish which are the distinction of the old masters. They look as if pointed to last, to become heir-looms and domestic treasures, and as if they ought to be hung against carved oak panelings, or in cabinets sacred to meditation and illumined by a tempered light. There is a sweet autumnal spell often radiated from the canvas of Gray. It may be a fanciful idea, but his most characteristic pictures affect me like his immortal namesake's verse—correct and thoughtful—and with a latent rather than a superficial charm. On his easel is a deftly-grouped study of Hagar, Ishmael, and the angel; what a strong contrast, yet how much pure harmony in the composition. The rigid gaze and oriental face of Hagar, the ærial position and rich blonde of the heavenly visitant, the bowed form and pure tints of the drooping child; figures, drapery, color and grouping, all betray the patient and skilful artist. A nude figure which he will turn from the wall at your bidding, is a triumph of color and form. Note, in a sympathetic mood, the little picture called "Twilight Musings;" how cool and sweet is the light, how graceful the loose-clad figure; what a penserosa attitude; how the tessellated pavement, the dark-veined wood, the vase, the open window, each object induces reverie; and how admirably is the tone of the whole in accordance with the reflective enjoyment that steals from the lovely countenance of the musing girl! The London critics appreciated this picture. The "Peace and War," though too allegorical for popular effect, has many of the excellencies of drawing and color and expression that distinguish this accomplished artist. We are not surprised that his cabinet portraits are so much sought. Many of them are gems of art, and, when associated with the features of the loved and lost, must become greatly endeared to their possessors. It is delightful to have a picture adapted by its size for boudoir or drawing-room, that combines the attraction of mellow coloring and high finish with the personal associations of a family portrait.

One is sure to find good bits of Southern scenery at the studio of Richards: a native of Carolina, he knows her live oaks, streams, and evergreens by heart; and has recently given excellent proof of his appreciation of nature in her most picturesque American forms, by the articles written and illustrated by him in Harper's Magazine. Lake George, the Juniata river, and Vermont mountains, have been favorite and well-studied subjects with him. He is thoroughly aware of the scenic phases of the different States of the Union, having passed many summers in sketching their respective features. He has a large number of studies, some of patches of woodland, some of forest streams, and others of the details of landscape, plants, stones, and individual trees. With this suggestive material, and his own fertile invention, Richards is constantly at work upon original compositions, some of which are quite poetical as well as correct. Here is a large canvass with the purple haze of the Indian summer; on a cliff over-hanging a deep, broad vale, covered with variegated foliage and a golden-tinted atmosphere, sleeps an original chief dreaming of his paradise; which thus mystically looms to the eye from this "shoal of time." The most subtle and gorgeous effects of an American autumn are given with rare beauty and impressiveness.

Ehninger's etchings illustrative of "Dolph Heyliger," and "The Bridge of Sighs," executed five or six years ago, showed a decided talent for expression, and an executive facility that quite warranted him in adopting the vocation of an artist. Mindful of these signs of promise, I sought the young draughtsman with an eager desire to behold what he had accomplished during the interval passed abroad. My best anticipations were more than realized. Not only has he proved a faithful student of the elements of his art, but has attained a degree of practical skill, and manifested an individuality rarely achieved in so brief a period. Wisely devoting himself to drawing under the eye of a thoroughly educated French artist, he has avoided the careless habits and incomplete discipline which so hamper and limit the success of most of our young painters. Some of Ehninger's figures are outlined and foreshortened with the correctness of an an adept; one can see in them a well-drilled hand; but what is still more pleasant to recognize, he knows how to seize on the principles of expression. His forms and faces have a decided meaning; there is positive character in his pictures. Somewhat of these traits might have been confidently predicted from the merit of his early sketches. They are finely toned; he knows the value of neutral tints; and manages light and shade with a most pleasing effect. Here, for instance, is a somewhat hackneyed subject, "The Yankee Peddler," but there is nothing Yankee in it but the subject; a patient handling and an expressive significance are manifest; nothing crude, hasty, or extravagant. Look at the two girls examining a piece of stuff; how characteristic the faces and attitudes! See the baby stretch over its mother's shoulder (while she bargains for the coffee-mill held temptingly up by the peddler), and strives to reach the trumpet the little brother holds to his lips: what mature and wise arrangement; mark the boy's features in the shadow of his hat, and the heads of the horses; they are full of truth and character; the general artistic effect is almost too good for a subject of this class; though very apt in their treatment, a higher range is more appropriate for the artist. There, for instance, is a gem; it is only a "New England Farm-yard;" but were I exiled to the tropics or Southern Europe, this picture would symbolize my country to imagination and memory. A negro-boy is watering a horse at an old mossy trough; down the road a woman is slowly driving a cow toward the gate; in the middle of the yard are four barn-yard fowls. Such are the simple materials. Note them in detail. The boy is one of those sable anomalies found about New England farms, that once known can hardly be forgotten: his action and face are inimitable; the horse is excellent, drawn and colored to the life, its individuality and its breed recognized at a glance; the expression of the face singularly true to nature; then the fowls, how exactly they look as we see them every summer-day from the window of our rural domicile; it is not merely that attitude, form, and plumage are given with precision, but the natural language of the birds is preserved: one is reminded of Hawthorne's graphic description of the Pyncheon fowls, only Ehninger's are less antiquated and in better condition. How sweetly falls the afternoon's mellow light adown the vista of the adjacent road, and over the freshly-tinted foreground. Some of the most natural points of the Flemish school are evident. Four little studies of costume and character, French in subject, and daintily executed, suggest that the artist would excel in the sphere to which Newton and Leslie have given popularity. His forte is *genre*. A small picture on panel has a finish and expression that would charm a virtuoso. It represents a youth killed in a duel, and his greyhound regarding his body; a dusky chamber with antique appointments, a richly-dressed form stretched on the floor, a bloody rapier and a dog are the objects depicted; but the look of the animal, the dead face, the *chiaro oscuro* affect one like Mrs. Radcliffe's night-scenes, or an episode of Froissart. My eye is irresistibly attacted by a small landscape; a cart whose Gallic origin is self-evident, drawn by horses of equally obvious Norman breed, a woman seated on the top of the load, with the well-known dress of a French peasant, a man in a blouse walking beside the team, a seaward view stretching from a treeless coast, on the bank of which rises a

picturesque mill, unite to form a scene that recalls my day's ride on the top of the diligence, from Havre to Rouen, when every object was novel, and I knew, for the first time, what it was to be a stranger in a foreign land. This is a perfect bit of Normandy; not an object or effect but tells the same story: a thunder-cloud, half-irradiated with sunshine, pours a rich though subdued light over the prospect. It is seldom that so many evidences of versatile ability and genuine feeling in art greet us in the studio of so young a painter; and we have lingered there only to enjoy. The class of pictures in which Ehninger excels is adapted, by the simplicity of the subjects and their size, to our drawing-rooms. The "Needle and the Sword," or, "The Lady at an Embroidery Frame," and the other, "A Man examining a Foil," etc, are gems in their way, and it is unjust to this artist's manifest and special genius, that he should give so much time to bank-note vignettes, excellent as they are.

It is well to consider if there be anything ridiculous in one's manner or appearance before coming within the scope of Darley's vision. If your nose is *retroussez* or pointed, your figure dumpy, or the way in which you try to be agreeable, slightly exaggerated, the quick perception and ready crayon of Darley may transform you into such a nasal individuality, such an incarnated dump, or absurd exquisite that whoever once beholds the sketch, will ever after involuntarily laugh at the sight of you even at a funeral. Lord Brougham said that the idea of his life being written by Campbell, the biographer of the Chancellors, added to the horrors of death; and the idea of being caricatured by Darley, may well add to a sensitive man's horrors of life. How many worthy individuals whom I would fain approach with respect, or at least courteous interest, has this wizzard's pencil made for ever grotesque to mind's eye! There is one who has become, to my consciousness, only a walking proboscis, whose nose I was not ever aware of until I saw it outlined by Darley; another whose real features I can never detect, because of the emphatic smirk with which the same magician has invested his face; and a third who never looks to me as if he stood on *terra firma*, but appears like a galvanized dumpling bouncing on an imaginary steed; and these transformations being based on the natural language of the parties, have just enough truth to be broadly hinted by their ordinary appearance, and thus the funny image and the real person are indissolubly mingled to the fancy. Two or three lines suffice Darley to metamorpose his fellow-creatures while he preserves their identity. I recognized instantly one of his portraits, although nothing was represented but the hind-quarters and the back of a pair of legs. It is easy to imagine the result when this facility and characteristic limning is applied to illustrate graphic verbal description. The artist not only re-produces but often transcends or satirizes the author's conception. It is no wonder that so clever and prolific a draughtsman is beset by the publishers; his free, significant, and original sketches will give a zest to any book. He makes one realize how ironical, acute, observant, and natural it is possible to be with no instrument but a lead-pencil; he tells a story with a dash, reveals a character by a curve, and embodies an expression with two or three dots. It is better than a comedy to look over his sketch book; he needs no coffee and pistols for two, but makes a palpable hit at his adversary with a pen-stroke. That is more fatal to dignity, if not to life, than a sword-thrust. It is well that with such a power to annoy, Darley has a noble spirit; it is only those who provoke his gift that he impales, or those who are really such a reflection on humanity that they are worth preserving as specimens of nature's journeymen's work: his talent for caricature is usually elicited by an amiable contest of wit with his brother-artists, or made the legitimate medium of a deserved reproof of intolerable affectation or overwhelming conceit: he only shoots at fair game. But there is another side to Darley's mind. He hold's a master's pencil, and can do justice to the most earnest and pathetic sentiment. Witness some of his elaborate compositions, his beautiful designs, his finished heads and groups; and especially that work of true genius, the illustrations of Judd's story of Margaret. We have had nothing in this style of art to compare with the exquisite and impressive drawings in which Darley has embodied his sense of the beauty, power, and truth of that remarkable fiction. Were the execution of the novel as classic as its material is original and profound, these illustrations, like those of Flayman, would have a world-wide celebrity.

At the corner of Broadway and Nineteenth Street, is the studio of Samuel Lawrence, an English artist. His peculiar merit is that of seizing the essential character of an individual and giving its predominent expression in a portrait. In this regard he has few equals. Witness his head of Rogers the poet, through whose age-stricken features gleam the benign wisdom and fastidious taste that breathe from the 'Pleasures of Memory;' or that of Carlyle, whose prominent brow and thoughtful attitude bespeak the earnest antagonist of shams; or the dreamy face of the Howadji; the keen eye of Bancroft; the expressive look of Longfellow; the ideal air of Tennyson; the lofty cranium of Henry James, and the Vandyke-like portrait of G. H. Calvert. In each of these well-known men, and in the 'counterfeit presentment of many others of the gifted and the fair, is at once visible the *characteristic* both of lineament, of mind and of disposition. Invaluable to friends are such intellectual reflections of the loved and honored; while crayon drawings thus strongly outlined and individually expressive, are the best of all for transfer to steel, copper, or stone.

Here we are in one of those spacious avenues projected by the sagacious council of Governeur Morris, which redeem this metropolis; a glance suffices to convince us that it is not the fashionable one: a railroad-car glides along the centre; plain, substancial brick dwellings line the way; provision, dry-goods, grocery-shops, form the basement range: the street, though broad has a most provincial and trading look; even an old Dutch gable would be a relief to the eye; but only monotonous, unadorned fronts, and flaunting ells of woollen and chintz, or huge quarters of pork, vary the perspective. Yet even in this unpicturesque thoroughfare, we discover an artist. Ring at that yellow door where the plate is inscribed with the musical appellative of Eugenio Latilla*; by his velvet coat and straggling beard, giving a Vandyke air to the figure, we should know him anywhere for a painter; and he is established in the Sixth Avenue, a man that has fraternized with some of the best artists of the day, lectured to his English students, presided at meetings of the British Institution, and after a long sojourn in Italy, brings to the new world his versatile ability and wide experience. Latilla is the brother-in-law of Freeman. He executed in Florence a series of fine linear etchings on steel illustrative of the New Testament, with the passages in original characters of his own invention richly illuminated. This elegant volume is a gem of its kind; the heads, figures, and grouping are in a chaste style, and abound in devotional feeling. Fortunately the plates are retained by the artist, and several copies of the work have been disposed of to lovers of Christian art in this country. Haydon once addressed a letter to Latilla commencing:

'My dear Fresco Master;' and it is in this branch that he excels; two houses in this city bear witness to his superior taste and execution in fresco painting, and the wonder is, that this beautiful method of decoration is not more generally adopted; whoever contemplates such an experiment will do well to consult Latilla. He has also studied architecture with much success, and has planned a Modified Gothic remarkably adapted to the wants of this country: we hope an opportunity will be granted him to exhibit his designs in the shape of a public building: the style would prove very effective in church architecture. As a portrait painter his skill and taste are excellent: witness that lovely face over the fire-place; it is one of those fair and delicate English girls who seek the mild skies of Italy, and bloom there in extoic beauty: it was painted in Florence where the lady's family reside. Opposite is an elaborate historical painting, the subject biblical, which gained the approbation of capital judges in London. This artist has just finished the portraits of fifty of the most emineut American clergymen, taken from daguerreotypes, of cabinet size, and intended for a large engraving, which will doubtless be exceedingly popular. The truth of these portraits is extraordinary; indeed, Latilla never fails to catch the

* Now established as rural architect in the neighboring county.

expression of his sitters; and his time has been mainly occupied since his arrival, it this most lucrative branch of art. What a fine head is that Greek of Malta near the window! Latilla has proved of signal benefit to the School of Design, lately established in this city. His instruction already bears fruit, in the well-executed wood-engravings of the most advanced pupils; his benevolent sympathies, as well as his artistic intelligence, have been enlisted in this philanthropic scheme. But knowing as we do, his varied abilities, we hope to see his graceful designs in the higher class of our publications, and a public edifice erected according to his truly original plans, and internally decorated in his genuine fresco style. He has lately devoted himself to rural architecture, and for that purpose contemplates a permanent residence in the country. All who are familiar with the biography of Campbell, are aware of the poet's idiosyncrasy analogous to that of Goethe, a sentiment for childhood, not as psychological as that of Wordsworth, but having all the character of an individual attachment. This beautiful trait seems quite appropriate to the author of the 'Pleasures of Hope;' it was not, however, entirely the result of his ideal and sensitive nature, but doubtless gained emphasis from his domestic misfortunes; in the prime of life he was deprived of those enjoyments which a home yields, and on which his heart was singularly dependent. One day Campbell entered the house of a friend and was instantly magnetized by the portrait of a child that hung on the wall of the drawing-room; it was one of those bright, winsome faces that appeal irresistibly to the sense of beauty. The poet was eager in his inquiries as to the history of the picture, and learned that it was borrowed from the artist, and a genuine likeness of his little girl. He could not rest until his friend promised to obtain for him the refusal of the work; then he desired an introduction to the painter, and when the portrait became his own, he sought the acquaintance of the beautiful child, who immediately became an object of the most enthusiastic interest; he visited her with regularity and the devotion of a lover; and to her were addressed the ardent 'Lines to a Child,' in his poems. The head that accompanies them, in the illustrated edition is engraved from the portrait, the painter was Latilla, and the original is his daughter, whom I have seen there by the fireside, (and could trace the resemblance clearly in the eyes), subsequently the fair bride of a clergyman, and whose early death husband and parents now unceasingly mourn. With this charming episode of artist-life, we must, for the present, take leave of the New-York artists.

From the New York Tribune.

THE STUDY OF ART AT ROME.

The mantle of Boswell, Dr. Johnson's most affectionate follower, has fallen on his relict, Miss Patience, Boswell, a lady-student here, who has been so aimable as to allow me access to her journal, from which I have drawn copious extracts, illustrating not only her admiration of her master, but also the facilities which Rome affords to an earnest and devoted woman for the study of art. She wrote on Monday March 3:

"Signor Doctus exclaimed 'bravo' this morning in opening for me the door of his studio. It was scarcely eight, though his cigar was almost finished, and the coals already whitened in my little *marito* which was waiting for its place at my feet. 'Did you take a long promenade yesterday?' was his usual Monday morning question. 'Yes,' said I, 'we rode to Monte Mario; but I hesitated to tell him how we saw Rome at our feet, and heard her bells, and saw the hills upon the plain, and the distant blue and pink and white mountains, and the sheep in the valleys, and the low thatched kennels dotted over the fields, where the sheperds sleep, and the green hill-sides, and the poled vineyards, and the Pope on his promenade to the Ponte Molle, and the courier before, with a drawn sword, to bid all carriages stop and all people descend and kneel; and how we listened to the wind in the pines and the wail of the cypresses, and felt the soft pressure of mother earth, and smelt the Spring and picked up daisies, and watched the shadows of the clouds on the landscape, and heard the birds, and looked at the dark spots of ruins in the city and their bold irregular setting against the turquoise sky, and were gay in the sun and sober in the shade, except when awe filled us on standing steadfastly and looking long—face to face— at Rome. I only said we went to Monte Mario.

"The old man replied with an indifferent nod, and said 'So you saw no antique art?'

"'None but the ruins in the distance.'

"While putting additional shavings and bits of boards in the stove, still sipping his cigar, he continued: 'went yesterday for the thousandth time to the Arch of Constantine. You should go there often and look at its reliefs and statues. Constantine was a brigand. In his time art and morals were in decadence. Whatever his own epoch engraved on his arch is bad; but its worthy ornaments were pillaged from the Arch of Trajan, and stand still in perpetual triumph beside the works of latter time. Have you seen these sculptures?' asked he. 'Yes.' 'Once, twice, three, times?' Yes,' I replied.

"'Have I shown you my engravings of them?' 'Yes.' Then he condescended to speak of them further. 'You recollect the one in the middle arch, and should have observed Raphael's acquaintance with it in his Battle of Constantine at the Vatican. Look at the engraving of the latter on the wall; regard the action and variety of movement of men and horses—the former fighting, falling, and one presenting a dissevered head to the emperor. These Ideas were inspired by that relief. Contrast it with those on Titus' Arch, whose style is comparable to that of Perugino's slim, straight figures. But here the composition is rich and varied. Then the statues of the prisoners on the arch are *superb*, and the medallions all around the monument *stupendous*, [except that Il Signore added the superlative *issimus* to every qualificative). 'Flaxman and Thorwalsden also stuied these works immensely, and hence their great success. They are richer, more varied, and so, grander in style, but less severe and finished than the Greek reliefs of Phidias; they are to the latter what Raphael is to Leonardo—both superior to all others.'

"He will never draw disadvantageous comparisons between these two masters; both, he says, are men beside the ancients, gods to moderns.

"While talking, he gathered drawings from Tajan's column and from the arch of Constantine, and explained again every motive, calling attention to expressions of ensemble, and detail, and bringing in casts from the originals to show other effects not in the drawings.

"All this time I had stood with my bonnet in my hand; then, as if I had been wasting time, he hurried me to my work, arranged my drawn model of the proportions of the human head, and retired to his inner apartments, carrying his little earthen basket of coals with him. I do not think there is any chimney in his rooms, for our stove-pipe goes out the window through a drawing of Flaxman's—Achilles' Shield.

"Matilda, daughter of the owner of the palace, has come to draw to-day. She has had the fever, and is just recovered; delicate now, and very interesting—a silky-eyelashed, short-lipped olive girl with very soft abundant, brilliant black hair. She is modest and timid as a fawn, but three young brothers raise Ned in wispers while the master is in his room, and throw balls of bread at each other and hit the screen which seperates us from them. It must have been their mischief which pierced its frailty in the breast of Clio, for it is simply a great drawing on paper of Raphel's Parnassus, hung with cobwebs, supported by wires, cane-stalks and strings, and partly pinned over by drawings from Belini, Titian, and Correggio.

"Nothing is amiss for illustration and instruction about us, Doctus blows off the dust from a cast-bone or book when he wishes to call our attention to it. All is convenient, and we are made comfortable by the simplest means. The air is kept from our feet by pictures and drawing-boards placed around our tables; bits of antique statues or monuments keep these secure. At my left a piece of a bomb, thrown in at the last revolution, preserves one protecting picture in its place. The room

is full of still life,' and subjects for '*tableaux de genre.*' The head of Adrien is stuck over with pine-cones of different kinds from here and from Mount Lebanon; Peacock feathers float over the fighting Gladiator; birds' wings, dried fruits, shells, and skeletons of various small animals lie on the plinth of the Hermaphrodite; human bones are piled under one table; horses' under another; a dried snake lies on the pedestal of Ajax, and between Niobe and the young Augustus is a little museum of ducks' and eagles' heads and feet and wings. Casts, drawings, paintings, engravings, photographs, cover the walls in layers.

"At ten the child outside in the street calls the boys to their other lessons. Before going, one sprinkles his corner and brushes up his crumbs and waste charcoal and pencil-nibs.

"Master Doctus enjoys order, and so the dust and cobwebs of thirty years lie in their accustomed places. He comes in often to renew our coals, to correct our work, smoke, and discourse with us. To-day he brought a vellum-covered book and bid me sharpen anew my pencil; he desired me to write at dictation some Italian principal, of which this is the spirit: 'Seek nature everywhere; know the reason of every 'line you make. It is the part of a young artist to do 'nothing but what he is willing to do well, because the '*doing well* finally passes into habit, and habit 'conducts to facility. (Signed) Ludovico Caracci.'

"He asked me to place these lines in my Bible for constant reference. I promised to do so.

"After talking some time of the concientiousness of this master, he took my place and dotted with charcoal the corrections I should make in my outlined front of a man's head. At first I must observe carefully my proportions. One-fifth of the hight of the head marks the beginning of the hair on the forehead, the remainder of its hight is divided into three equal parts; the first line of division defines the beginning of the nose between the eye-brows; the second comes a little short of the end of the nose on paper, the third bounds the bottom of the single chin. This last third is sub-divided into three equal parts, the first line to which indicates the division of the lips. The outer angles of the eyes must be a little below the middle of the head, and these, joined to a point between the lower lip and chin, must form an equilateral triangle. One-eighth of the head's hight gives the length of the eyes; their widest opening and diameter of the iris must be about half this distance. The ears must stand between the same parallels as the nose; from a little below the end of the latter to the top of the head the distance is equal to the greatest width of the head. By another rule, as fixed, the face is found, and so the head of a man becomes a complication of geometric diagrams; harmonious and truth-telling as the sections of a cone, and giving the datta from which the whole frame is measured. These are the rules observed by the Greeks, for we have Leonardo da Vinci's own drawings from Vitsuvius's demonstrations of them, and they tally with the best Greek works. 'But,' Doctus added, 'the Greeks carried their compasses in their eyes and kept truth and harmony with them beside. But these rules presuppose entire tranquility of pose and muscle; hence the cavils and mistakes of many. For instance, the Apollo-Belvidere is really a man eight heads high, though Wincelman calls it only seven and a half; because in measuring he did not account for the angry triumphant parting of the lips and slight fall of the lower jaw which elongates the measure of the head.

"I resumed the charcoal, and adjusted my man by rule, while Doctus turned over a cinquecento volume on architecture, occasionally making remarks, until he commenced a review of our recollections of his previous lectures on this department of art. He has the habit of putting himself in the scholar's place, and of compelling us to enlighten him upon whatever subject he may choose to question us. So we told him all we knew of the various orders; then he gave illustrations from engravings, by way of repose from our drawings, and bid us notice in our walks various antique structures—first the columns of the Pantheon as models of the Corinthian style, the galleries of the Coliseum as illustrations of the proper adaptation of the different orders. There the Doric, the simplest, shortest, stoutest column is placed the lowest, as fit to bear the heaviest burdens. Next higher is the Ionic, a little slenderer and more decorated; and lastly comes the Corinthian, the most slender and ornamented of all, related to the first as a heroic statue to a plodding peasant. The Greek drew all proportions of art from the human form. A Corinthian column is an Apollo, or hero eight heads high; the other orders are men of seven or seven and a half heads in hight.

"After explaining to us all the fine parts of the Pantheon, and alluding to some smaller structures, he turned over to the first and succeeding plans of St. Peter's, which changed from Greek to Latin, cross and back again, till finally the latter prevailed, 'principally,' said he, 'to bear on it facade in great letters the name of the Pope that completed it.' Finally we came to Bramante's circular chapels at St. Pietro in Montorio, which caps all modern climaxes. The devout old man held the engraving out before us quietly for some moments, wrapt in admiration at its contemplation, and then said reverently: It seems to me to have dropped down from heaven.'

"Then this discourse turned, and he brought us engravings to show how various masters had introduced this structure into their own pictures. After awarding it all the praise a thing of human art could claim, he seemed absorbed in thought, while arranging a long-tubed pipe, and at length said, 'Art is universal,' and quoted Leonardo da Vinci, who says it is not enough to excel in one department of it; the great artist excels in all. Leonardo himself was architect, sculptor, painter, musician, mathematician, machinist and author. Raphael is no less architect than philosopher, historian and painter, in the School of Athens; no less colorist than Titian in the fresco of the Miracle of Bolsena. Both approach the bounds of divine universality in the totality of their works. 'Michael Angelo knew the nude like an angel,' said my master, 'but he often distorted it like a devil. Titian like, he is always grand, often sublime, frequently inconsistant, and rarely graceful. He is stern and awful, like Jupiter—Raphael divine and charming, like Apollo and all the Muses. The latter excels in grace and composition —the former in majesty and power.'

"However long he talks he never fails finally to pin the moral on at the end, and here he said: 'Go to work 'again, Time is short, art is long; you see what great 'men have done.'

"In his ardor he forgets we are women, and inspires us to lofty aims. He tells us to carry pocket drawing books like Dominchino and Poussin to jot down new expressions, attitudes and bits of drapery. He poses himself with one palm up for the book, and with the other hand's fore finger for a pencil, shows us how it should be done—quietly and quickly, so as not to attract the attention of our object, Consciousness on the part of the model is death to nature and true art. Kindling still, he says there is enough mediocrity now in the world, and adds: 'Do you desire to surpass it? 'Then cultivate your eye for beauty and your hand for 'execution.'

"He has shown us numbers of these little vellum-coverd handbooks of his own, drawn full of studies of all art and nature. They are copious indexes of what he has in his head or at the ends of his fingers. Does he require a helmet, for instance, in one of his compositions, he turns to his little book and there finds dozens of them of all forms and patterns, from Greek and Roman models; the former being always high above the head like that of Pericles and the Grecian Menerva's, while the latter are more rounded to the form of the cranium. So he has learnt by heart all the types of ancient art, from the lyre of Apollo to the distaff of Penelope, from the chariot of the Games to the bow of Cupid; and the tile pavement of the studio is drawn all over with rude charcoal sketches in answer to my daily questions, for he often replies to me by signs and drawings rather than by words, as it is the eye more than the ear that needs cultivation in painting and sculpture. It was one afternoon when I rose from my work, while I was dressing to come away, he called me to him to observe his corrections on a head I had drawn from memory at home. He is hard to please, and did not I so much reverence his wisdom, I could not bear his severity. My drawing was too neglected both in style and study. But particularly he exclaimed against my making the eyes too little open, and reproved me sternly for not therein observing

the character of the head I was to draw. I had made the iris touch the lower line of the eye, while in most ideal heads this should be intact except at the top, where its upper outline is covered by the eyelid. I hesitated a moment in the correction. Most of the people I knew did not show the white's of their eyes below the iris; but I made the desired change, and a severer character came into the face. He showed me all the casts in the room to illustrate how widely fine eyes opened and consequently the lower line of the iris must be entire, otherwise its circle would be too great even for the bovine-eyed Juno. In cases of fear and convulsions, as in the possessed son and frightened father in the Transfiguration, the eye-balls start out and the upper outline of the iris becomes also visible. In Venuses only, and similar characters, does beauty allow a closing of the eye sufficient to conceal both the upper and lower outlines of the iris.

"'A little more confidence in your master,' said he in a rebuking way, while he turned over a heap of engravings and facsimiles of drawings to show me their eyes, repeating over and over again: 'Raphael did this; Leonardo that; Albert Durer that; will you believe them and not me?' But I protested I did believe, and only desired him to help my unbelief.

"'Then,' said he, 'do not take every-day eyes for your models; but observe long and devoutedly, and secure the most beautiful types for your different characters; but first study the antique to learn to choose your nature. Hence the antique at present—*pas d'autre chose*?'"

Miss Patience's journal continues in the same symbilline tone, inspired by her oracular master; but she draws as much as she writes, and I regret I cannot transmit you also some of these sketches. In one of his colored portraits, Signor Doctus is represented with a small cast of Venus in one hand, and the tongs, which he has forgotton to lay down, in the other; of course his pipe is in full function. He is of middling hight, in morning negligée, much neglected even for an Italian artist. He wears a snuff sack, and ancient slippers; his hair is steel colored and cut closely, showing the severe outline of his head; his hands are muscular, with remarkable tapering fingers and fine nails. His hair grows down on his forehead like a Greek's; his moustache and wiskers are long, scanty, and gray. He is without cravat, his collar open and neck exposed. His eye is small and searching; his whole attitude indicates absorption in the object of his contemplation.

There are, besides, innumerable outlines of objects in the studio, and of people and things, single and in composition, seen in her daily walks to her lesson; but we must let her writings speak for her now:

"To-day Master Doctus saluted me with has usual '*Come sta*,' and before I had time to reply, while arranging some anatomical drawings, he asked, 'Which is the largest bone in the human frame?' I replied, cataloguing the others also as correctly as I was able, and adding their various characteristics. When I hesitated or made a mistake, he would say, 'I suppose you have not that bone: nevertheless it is very useful. He enforced the necessity of a perfect familiarity with their forms and uses as necessary to a correct rendering of all the muscles, and to a proper appreciation of all human forms. Then he showed us casts illustrating the ancients' knowledge of anatomy, and pointed us to various copies from Michael Angelo, full of nature. Then he explained the intention of every undulation in the outlined head he had given me for a model—why this protuberance and that indentation—this was bone—that cartilage—that muscle, each requiring its proper treatment, and all their proper harmony. Meantime a company of sculls had gathered on my table—men, women and children—noble and ignoble. He hoped I was not afraid of them, and assured me he had had them for years, and they had never spoken. He placed grand and mean skulls together, and bade me choose the nobler forms; afterward he showed the difference between the male and female head, and the difference between them and the heads of children and infants—enjoining again and again a careful study of Nature, in order to be able to invest each character with its proper form. He referred us to the outlines we had already made of infants' heads; first, front and profile at the earliest age, then the same at three months old then the same again at three years of age; the latter we had drawn within the outline of man's head, for a better comparison of their forms. At the latter age the child is half a man in hight, while at birth he reaches only to his mother's knees.

"After this rather dry discourse on proportion, he showed us many drawings from Titian and Corregio, who particularly excelled in painting children. Raphael's are, perhaps, more beautiful in expression, but less infantine and true in nature; they have usually too much judgment. To enforce truth of form upon us by contrast also, he placed beside these possible younglings the progeny of other masters, which seemed rather Tom Thumbs or reduced Napoleons than real babies. In children the head is much larger in proportion to the body than in adults. In extreme infancy, the width of the head and chest are nearly equal; in a child three months old, four of its own heads equal its hight; in the man, from seven to eight enter therein. So from infancy to adolescence the head preserves a certain supremacy in its ratio to the body. He was extremely minute in these details, in order to prove the science requisite to Titian and Correggio to have produced such pictures of children as they did.

"Of course the antique was not forgotten in these discussions. We were referred to the child with the goose at the Capitol, and to children supporting festoons in several superior bas-reliefs; these are all nature herself embellished, and the great cinquecento masters studied them with the most inquisitive attention. He also showed us studies of his own, still unengraved, of infants and children, from birth on through every year till the twelfth, comparing each with the full developed male and female figure. These were only part of a series of proportions for the use of artists generally, for none here are sure of their models or compositions till they have consulted Signor Doctus. Does a painter desire to represent Christ twelve years old in the temple, the good old man explains to him the proper nature to be secured. Some time ago he showed me his published works of the comparative anatomy of men and horses, extremely useful to those introducing the latter into their works. Raphael showed his profound knowledge of their proportions in the 'Repulse of Atilla;' but in our studio, an engraving of Michael Angelo's—'Conversion of St. Paul'—is placed behind the window-shutter, because the horse is so faulty in design.

"This morning has been full of listening and labor like all others except Thursdays and Sundays, when I am free for other duties. We have been reviewed as usual on former discourses, and stored with ideas for future digestion. Meantime a sheet of pen-drawings of male and female hands in different positions has hung before me. Doctus demands almost perfection in our copies, as we use them at home for models in repetition till we are able to execute well from memory. But proportions, perspective, architecture and anatomy are not the only phases of art presented to our attention. There are days when the spirit of grace and beauty imbues our master, and then we listen to his raptures on the grace and grandeur of Raphael, Leonardo, and Michael Angelo, or we follow him further back to his more sacred shrine before the antique. Then only, the full devotion of his soul exhales. 'Thank God you have come to Rome,' said he, one day, after showing me the Juno of the Vatican.

"I should not neglect to note here a long past talk on Venuses and other beauties. One day, just after I had seen the Venus of the Capitol, for the first time, he put himself into the inquirer's place, as he is apt to do, and begged me to favor him with my impressions of her. I was much embarrassed; I knew they must be so imperfect beside his own: 'But,' said he, encouragingly, 'what did you think of her? How did she seem to you?' I said quietly: 'Very beautiful.' 'True,' said he, 'but how in comparison with others you have seen?' It was a perplexing moment. It is difficult for youth and inexperience to embody distinct ideas on such subjects, especially when nice distinctions are required. But I listened to the inner voice and responded: 'The Venus of the Capitol possesses more easily appreciable nature, but less grandeur of style than the Venus of Milo at the Louvre. The latter is more severe, more

a goddess, more one born of the mighty deep; the former more lovely, more sympathetic, more humanly beautiful; and both seem to me of far nobler family than Venus de Medicis. This last is older, more developed, less reserved than the Venus of the Capitol, but really the adored and legitimate spouse of Vulcan, the God of Fire. One is a portrait of the young bride, the other of Cupid's mother; but the Venus of Milo is the celestial companion of the gods.' The old man listened with more patience than I had anticipated to my expressions, and seemed inclined to credit them. 'But,' said he, 'you have not mentioned the *Venus accroupie*, just coming from her bath, at the Vatican. You have espoused all the others, and I appreciate your delicacy in leaving her to me. She is mine—*ma femme.*' I will not chill his declamation into cold English. His cigar was laid down, and his eyes lighted, and fervor crept into his speech as he talked of her. He said she had no similitude, no kin on the earth, so he called her *his*—his wife—just as he calls the Juno his mother. He never omits her title, 'Mother,' or 'Mother of all the gods.' The priests remove their caps at the titles of the Virgin; Andrea Sacchi never spoke the name of Raphael without uncovering his head. I constantly imagine the devout Doctus on bended knees before these two divinities. The beauties of the 'Venus accroupie' he summed up in perfection of details and harmony of ensemble found in no other representative of the loving goddess. But it requires a full inspiration of Art to appreciate this as he does. As only the long-trained ear and delicate soul responds to music's softest breath, so the eye and soul must long have polished each other to be able to reflect clearly such subtle beauties.

"But talk never exhalates in breath with Signor Doctus. Meantime he had formed a charming circle of casts of Venus's heads and torsos around me; each lovelier than the other, striving by this means to fortify precept by example, and to strengthen impressions by comparisons. It is easy to fill one's self with the opinions of others on things of art, but long and difficult to train the taste and judgment to an independent and just appreciation of them.

"When I had gathered some ideas of the various Venuses he had presented to me, he called my attention particularly to the head of another at the Vatican. 'It is beautiful, is it not?' said he. 'Yes, truly,' I replied, for I thought so. Then he brought in the head of Isis, and said 'It is *very* beautiful.' Then he pointed out the fine parts so lovingly that I thought it must be the real secret-favorite; but no, by no manner of means. Slowly and reverently he brought from an inner chamber the Psyche of Naples, with the upper part of the head cut away, and placed her beside the Venus and Isis, carefully adjusting them all in profile, for I speak of plaster casts. A silent enthusiasm gathered in his air. I grew bewildered, as in reading Festus; at the number of his loves, and still the '*Venus accroupie*' was not in the lists: but I perceived what he desired—the entire superiority in character of Psyche. One woman may be beautiful alone, but your inconstancy becomes legitimate when you see another more beautiful beside her. The Empress of Austria and the Empress of the French are examples to the point; the latter would surely win the golden apple from any loveing connoisseur.

"Beauty is the summed perfections of distinction, grace and form. It is a thing grand and rare to find all combined. Isis was cook, Venus femme de chambre to the grand, simple, mortal and immortal Psyche. It is remarkable the unconscious supremacy the latter bears in the presence of these other majestics; and this proves that there are parvenus in the skies whose silver sandals the rarest blood of Jove is scarcely fit to unloose.

"Nothing is more interesting than to study statues and busts by comparison, and the lower orders first, so as not to neglect or despise their beauties, even though these may be almost lost in faults. The young student's long and most difficult lesson is to learn to see beauties before faults. It is in art as in character. The natural man sees the worst first. Our own ardor for the beautiful should warm it out from all its resting places, while we leave the bad or indifferent in its own cold insignificancy. Nothing betrays the parvenu in art so soon as his exclamations at faults; a child or peasant could do as much, and still be blind to all superior excellencies.

"To-day the Psyche and 'Venus accroupie' have won the prizes of beauty in their different characters; one is a maiden thinking of love, the other a woman in its full possession; one meditates on the mysteries of her illusions, the other rejoices in the realization of them; one is faith, the other fruition.

"But do you desire,' said the enthusiastic Doctus, 'another type of majesty and grandeur unexampled, embodied in forms of unsullied truth and beauty, contemplate the great Juno of the Vatican, mother of all the gods.' I must not omit the titles she is invariably honored with. 'There are three likenesses of her there, but observe them all,' said he, 'and you will soon recognize the imperial sister and wife of Jove, and appreciate the honor she rendered Thetis at the celestial councils, in condescending herself to bear to her the cordial cup of consolation' Head of all female potentates and powers—stern and maternal to command, she stoops to lesser gods and men to win and encourage by her love and power. The statue is magnificently drapped, so that not only her vailed form, but every fold of her robes exhorts to grandeur of soul; and in her severe, celestial face, it is not enticement but a stern command that bids you be a prouder, stronger, nobler woman."

So Miss Patience's manuscripts are filling—I trust you have not been wearied with these long extracts, but are willing to believe me ever yours,

AU REVOIR.

SUGGESTIONS OF SUBJECT TO THE STUDENT IN ART.*

BY AN OLD TRAVELLER.

CHAPTER VI.

Helen the Beautiful—Sacrifice to Diana Artemis—The Bride of Sparta—A Place of Peril—Otho the Sanguinary—Otho the Wonder—Pope John XVI.—Crescentius—"Thy Sin shall follow thee!"—The Gift of the Roman—Conrad of Franconia—The Soldier's Boot—A Picture from the *Times*—The Sheik-ul-Islam—The Patriarch—The Armenian—The Rabbi—The Cranes of Ibycus—Might of the Eumenides—A Legend of the Bruce—St. Fillan the Hermit—The Luminous Hand—The King's Vision—A Frenchman to be painted—Lea Hurst—England's Angel of Mercy—The Wide-World's Florence Nightingale—English Cathedrals—Ancient Oratory of St. Martin—King Ethelbert the Christian, and Bertha the Queen—Travelling, Past and Present—The Packhorse—Peasant Girls of England—The Gay and Roving Carriers—The Flying Coach.

Of Helen the beautiful, as her bright eyes beamed over the world when the best of their light had departed, and after her downfall had deprived their gaze of its firm self-assurance, we have representations in abundance; but not so of that better period, the fair morning of her life, when as yet there had arisen no cloud to dim the radiance of her beauty—when the faultless features had contracted no expression that could mar the effect of their pure outline, their delicate texture, their soft and chastened coloring; while the perfections of her form retained all that nameless grace of motion which results from merited self-approval, and some portion of which must needs be lost with every step towards wrong. No: we have not enough of Helen as she was in that young day, and the sculptor may look to it with advantage, for it is his affair. Let him give her, for example, to our delight and admiration, as she is prepared to lead her young companions, when all are going up to sacrifice in the temple sacred to Diana Artemis. She lifts the wreath of triumph, and a moment shall see it placed on her unsullied brow; but as yet we have the faultless contour unbroken: wherefore take now thy chisels, Sculptor—wait not till those candid brows be shadowed, though it be by congenial blossoms; let the chaplet still remain half suspended, and give us the glad sweet face of the peerless princess as she stands *now*—blameless.

For the painter there is also place—but his moment is not the same, and the subject he shall take is of different character:

* Continued from page 199.

he will find it in certain stanzas from the Lyrics of Stersichorus, which do precisely the thing we have been talking of—they take the artist back, *videlicet*, to the blissful period when he may most frankly delight in the study which that all-beauteous Helen presents. The words are these:—

> "Rolled the refulgent car along,
> Bearing the fair bride of the Spartan king,
> Who, in her radiant beauty, like a star,
> Or earth-born Venus, shone afar.
> And see! with dance and choral song
> Mycenæ's dark-haired daughters bring
> Their choicest gifts, and golden quinces throw
> In her chaste lap—and boughs of myrtle bloom,
> Odorous and white as snow—
> And roses, on Eurotus' banks that blow—
> And violet flowers, the earliest of the spring,
> To break the winter's gloom.
>
> "Beautiful Helen! in thy queenly pride
> To thee we bow, great Menelaus' bride,
> With downcast eyes and bended knee;
> Sweets to the sweet—we offer these to thee."*

The painter will be at no loss for beauty of site fittingly to exhibit the lovely train called before him by the words of the poet. Softly undulating, the sun-lighted landscape lies fair beneath the rich deep blue of the Grecian heaven; cypress, vine, and olive, lend the variety of their tints; on a gentle acclivity there gleams the pure white marble of a delicate Ionian fane; and, glittering afar, is the calm unruffled surface of a boldly-curving bay, heaving slightly, but only as with the peaceful breath of a joy-fraught life; white sails, as were they sea-birds, may be discerned on the waters, but all are in the remote distance—they do not mar the Elysian tranquillity of the hour by any thought of sinister arrivals—those barks pursue their unheeded way, and no evil that may lour in the future is now apparent.

To him who ascends a throne in his boyhood, a great and splendid destiny may seem to be appointed, but it by no means follows that his lot is a desirable one; on the contrary, a more than common amount of evil and suffering is but too frequently the result of his position—the rule of his life. Examples of this unhappy truth crowd on the memory. The life of Otho III., Emperor of Germany, who assumed the perilous seat in question when but twelve years old, is among the most prominent—as may with equal truth be said of that of his father, Otho the Sanguinary, into whose hands were given the reigns of sovereignty before he had well numbered eighteen springs.

Studies from the life of the first-named emperor, Otho III. namely, were made some years since, at the instance of the present writer, by a young Bavarian artist then painting in the Pinacothek of Munich. They were subsequently much admired by certain amateurs of Art at that time assembled in Venice; but the failing health of their author made it but too obvious that his work on earth must end before it had well begun, and not one of them was ever completed.

One of these sketches represents the unfortunate pontiff, John XVI.,—elevated to the chair of St. Peter, as most of you will remember, principally by the influence of the Consul Crescentius,—at that moment, when, made prisoner by Otho, he is brought forth to die the cruel death inflicted on him by command of the infuriated monarch. The scene of our picture is the summit of the Castle of St. Angelo: Rome, in all the pomp of her regal beauty, lies immediately at our feet; the seven hills are before us; and beyond lies the wide-spreading Campagna: but our interest is all centred on the melancholy group gathered within that narrow space which constitutes the topmost level of the fortress.

Otho has caused the eyes of the pontiff to be put out, and has otherwise cruelly mutilated his face; but the artist judiciously withholds the more revolting details, and we do but see that the prisoner, thus helpless in the hands of his executioner, is on the brink of doom: another moment, and those ruffianly figures, two of whom are already leading the blind captive forward, will close around him; they are preparing to cast him from the battlements to the court below, and a few fleeting moments only have to pass before they shall have accomplished the cruel mandate of their lord.

The second study gives us the Consul himself, at the moment when his head is about to be laid on the block: he, too, has been condemned, as you will also remember, by Otho: and for that same revolt wherein his influence had prevailed, to the expulsion of Gregory V., then pontiff, and to the substitution of the unhappy John.

The principal merit of these sketches is the correctness of drawing exhibited in the figures of the executioners, which, in both instances, give proof of more anatomical knowledge than is usually attained in the first youth of the student.

A third cartoon of the same series represents Otho himself. He is reclining on the purple couch of sovereignty, in a magnificent apartment of his palace. Implacable in his resentments, and otherwise tainted with the vices of his age, Otho was nevertheless brave and resolute, just and generous. The man here taking a short repose from the toils of a laborious life is of noble presence, and a not unpleasing aspect: the flower of his youth has scarcely departed, for the summers he has seen do but number twenty-nine; yet are the marks of care and suffering become apparent on his brow, and you would give him some ten years more, if you judged of his age by his expression. He is extending his right hand towards a woman of singular beauty and richly attired, who is in the act of presenting him with a pair of gloves: one of these he has already drawn on, and his hand is extended, as we have said, to receive the other.

And she who presents it to him?—She does so without hesitation; yet is there in her eyes a strange rigidity of gaze, and in her whole aspect a character all unsuited as it should seem to the features of one who is performing a service of affection, and might be expected to exhibit some pleasure in her office: whereas this woman's hard compressed lips betoken the stern resolution of one determined on some desperate act, rather than the soft sweet loving glance of her who, bringing a fair gift, is gratified by the gratification she is giving.

But this is the widow of Crescentius, and the gift she offers is the death of the recipient; hence those hard eyes, fixed observingly on the face of her unconscious victim, and hence the resolved sternness of the lips.

Otho, affecting to lay the crown of Germany at her feet, has reduced the proud wife of Crescentius to the condition of his paramour; but he has refused to fulfil his promise of espousal, and the Roman is avenging her wrongs by a murder. Those gloves are poisoned, and Otho dies by the gift.

In his mode of treating the third of these subjects, our artist made a slight deviation from the truth of history, which does indeed affirm the death of Otho by means of poisoned gloves, and that these were sent him by the widow of Crescentius for the cause assigned, is also a well-authenticated fact: but we nowhere find it asserted that the gloves were presented by her own hand, nor is it, indeed, probable that this was the case. The dramatic interest of the picture is, without doubt, greatly enhanced by the mode of treatment adopted, but of this part of the subject it is not now "our hest to speak."

Another study, and from a period of German history immediately subsequent to that just treated, but not by the same painter, has been taken from the reign of Conrad II., Duke of Franconia, who succeeded Henry II., the immediate successor of our previous acquaintance, Otho III. This represents the somewhat singular spectacle of an event which certainly did take place, and, being true, we may suffer it to come in, by way of relief to the painful effect produced by the stories preceding.

Conrad of Franconia was remarkable for the generosity of his disposition—not in the narrow sense of mere liberality, and the free hand of giving only, but in the wider acceptation also: the story alluded to is related among other instances. A gentleman whose possessions were not equal to his birth and bravery, had lost a leg in the imperial service, while performing

* These lines, a fragment only, are given by Mr. Jesse, as the translation of his friend, the Rev. J. Mitford. They will be found in a much-admired work of the first-named writer, namely, the "Favorite Haunts and Rural Studies," pp. 307, 308.

prodigies of valor in the effort to save a standard, which he brought off at the hazard of his life. Courad, informed of the circumstances, and hearing that the noble was poor, sent to bid him an andienee; and it is this meeting of the emperor with his mutilated subject that the painter has represented. The high officers of his court surrounded the monarch, and one of the most dignified of their number holds in his hands a riding-boot, filled to overflowing with gold coins of the empire. This has been presented to the sneeessful soldier of the standard, and the dignitary is now resigning it to the care of an old servant of the mutilated man, whose look of pride and old affection is so earnestly fixed on his master, that he scarcely seems to bestow a thought on the value of the deposit: with him,—a fine old warlike figure himself,—as with the soldier of Napoleon, "Honor is all." The story proceeds to say that Conrad, declaring his resolve to confer a liberal pension for life on the former possessor of the boot, theneeforth useless, demands the gift of his second son in return—assuring his gratified subjeet that the child shall henceforth be reared in the palace, and in due time be ennobled among his pages. This, too, the painter depicts. The boy, a remarkably beautiful one, is approaching from the outer hall; he is led forward by his tutor, a pale and grave looking ecclesiastic, whose placid but highly intelleetual countenance eomes in strong contrast with the bright, glad, youthful aspect of the ehild, while his sombre robes staud in equal distinction with the gorgeous habits of the figures more immediately around the throne.

The *Times* is a great magician. This truth is so deeply felt, so universally admitted, that many voices will at once arise to say, "We knew all that before." But the *Times* is also a great paiuter; and if there be any yet ignorant of the fact, let him read what follows, and his education shall in so far be amended.

"The reading of the imperial firman, granting equal rights to all the subjects of the sultan, was fixed for Monday last. * * * *

"The apartment destined for the ceremony was the great conneil-hall, spacious enough in itself, but by no means sufficient to contain the numbers of people who wished to be present at this important act. * * * *

"Beside the ministers surrounding the Kaimakam of the Grand Vizier, Mohammed Kibrisli Pasha, there were present all the members of the Conncil of State and the Tanzimat, with all the other high functionaries of the Porte. The Sheik-ul-Islam,* the patriarchs, the arehbishops and bishops of the different religious communities, with a good number of the most prominent men among the Mussulman and non-Mussulman population of Constantinople, likewise took part.

"This assembly, composed of the most distinguished men in Turkey, would have formed an interesting study for a physiogomist; nor would it have beeu found inferior to any similar assembly as regards intellectual countenances. The most prominent feature was earnestness. Notwithstanding the contaet with Europe, and the history of so many deposed and assassinated sovereigns, the person of the latter is still held in religious veneration. Even the rather turbulently disposed crowd outside became silent when the firman, sigued by the sultau's own hand, was taken out. Everybody seemed to be penetrated with the solemuity of the moment.

"The firman was read by Habat Effendi, the *Metkebji*, or Chief of the Chancellcrie of the Grand Vizier. When the reading was over, the Sheik-ul-Islam, Arif Effendi, read a prayer appropriate to the occasion; after which the grand vizier made an address to those present, in which he touched upon the most prominent points contained in the firman.

"When the ceremony was over, printed copies of the firman, in the original Turkish, were distribnted among the crowd. Translations into all the languages of the empire are in course of preparation, and when these are completed they will be distributed through the various provinces." * * *

* Few will now require to be told that the Sheik-ul-Islam is "Chief of the Faith." He is head of the law no less than of the priesthood, and is a dignitary of the highest distinction.

So far the mere statement of the facts by an eye-witness; but how siguificant are these facts! In another part of the paper are the remarks that follow; and if the simple declaration that so grand an event has been aceomplished has not inspired you at once to commence the transmission of its details to the never-dying canvas, here are certain words that cannot fail to make your heart glow, and wake up your imagination, or the one is colder and the other more torpid than befits that glorious name of Painter which you bear.

Dear friend *Times; loquitur:*—"If the will of the Eastern potentate be indeed supreme, and like the centurion of old, he has only to say, 'Do this,' and it is done, then may we eonsider that the greatest revolution of any age has jnst been aeeomplished beneath our eyes. A firmau of the sultan, establishing absolute equality between all his subjects, has been read before the assembled dignitaries of his empire. That empire is the dominion of Constantine and of the Caliphs in one. From the frontiers of Anstria to the shores of the Persian Gulf; in Belgrade and Adrianople; in Constantinople, Jernsalem, Alexandria, and Tunis; in the holy cities of Arabia, at the birth-place, and at the grave of the Prophet, the imperial ediet, translated into many tongues, will be read and pondered. Those who listened to its ordinanees a fortnight since at the Porte, were the representatives of the East in its widest sense. The grand vizier of the Ottomau sultans and the Sheik-ul-Islam, clad in the green robes of his office, impersonated that conquering and ruling faith, which, even to the days of our own William III., threatened Europe and Christianity. The patriareh of Constantinople, still the successor of Chrysostom, and the head of the earthly Church to 80,000,000 of meu, stood surrounded by bishops, whose sees were famous cities when France was a Roman province, and Eugland a wilderness of scattered Celtic tribes. The metaphysical disputes of a forgotten thelogy were represented by the patriarch of the Armenian Church, the chief of a nation isolated in features and language from any that now lives on earth. Last of all, there was the chief Rabbi of the Jews, who eame to receive for his oppressed raee the promised equality in their own holy land, from the lips of a Mussulman sultan. Whatever be its results, the event which has just taken plaee must always remain one of the most interesting in the history of mankind."

It must, beyond all doubt—must and will. Think, then, if it be not well your part to prepare for the visible presentment thereof in the highest place of our noblest gallery. I say "prepare," because I know well that worthily to depict this great event will reqnire all the energies of an earnest mind, powerful to comprehend the great and good, with all the devotion of a pure warm heart—loving that good cordially when and wheresoever it may be found, and desiring fervidly that its beneficent influence may prevail. To these must be added a keen pereeption, quick to eomprehend all the strongest points in every case aud question, that no portion of the interest may be sniffered to escape; an imagiuatiou capable of enhancing the force even of the most salient features, yet chastened by a delicaey recoiling sensitively from the baneful vnlgarity of exaggeration; and, joined to the rest, must be that excellent servant, the cool judgment, guiding a firm well-practised hand, ever ready to obey the dietates of the master-spirit within.

All these, and much besides, are demanded by the great and lasting work before you—but then you have them all; or if you do not fully possess them at the present moment, they are increasing to you with each advaneing day—yon are in culture for such a condition of being, you labor earnestly to secure it, yon look with reverenee to the older aspirants who have attained to these qualities before you, and with sympathy towards the comrade who is treading the upward path at yonr side? Surely yes! but if not, if you no not feel conseious to any one of these qualities, feelings, or aspirations, begone! it is not for you that a task so exalted has been reserved; and what still remains to be added, from the words of our good friend, is for such as shall better deserve to hear it.

For these, then, is written that which follows, and which is taken in like mauner from the *Times:*—

"Historians have discussed the causes of the French revolution, and have attempted to find its origin far back in the annals of the country. They could not conceive that a single age could produce by itself so marvellous a change. But what demolition and reconstruction of society will have been so complete as this great Eastern revolution, which, beginning some twenty years since, has lately hurried onward so rapidly, and seems destined still to pursue its portentous course? To practical minds, the domestic events of our own community may have a greater importance, but they must be few who can look on what is passing in those ancient lands, the cradle of the human race, the home even now of venerable nations, without a strange and peculiar interest. That religious freedom should have been proclaimed for the first time to the followers of churches persecuted both by emperors and Sultans—that material progress should be in store for regions almost forgotten by the busy enterprise of the West, are facts which must call for the attention of all, even amidst the most earnest discussion of our own affairs. It is like a vision of dry bones—dry bones called to life on the disinterment of a city hidden for ages."

There, then, is your picture. We have said that the artist who shall paint it will perform a great work, and he will do so; but is it a difficult one? To him who is fit for it, certainly *not*. Let him read again, and he will see that the picture is already painted to his hand; he has but to copy—that great brother of the brush, whose words we have given, have indeed left him little else to do. Being, then, what he is, our painter will let none of that "earnestness" which, we are significantly told, was the most striking characteristic of those assembled, escape him; but, going to his work with the consciousness of its high significance exalting and ennobling his conceptions, and with all his powers devoted to the worthy expression of its import, he will set before us the glorious event of that fortunate Monday in such sort as to make the representation, no less than the thing itself, an abounding "joy for ever."

Inexhaustible are the riches of Germany's beloved and justly boasted Schiller. No man takes from their abundance but to his profit: be your purpose what it may, never—provided only that purpose be good—can you turn to his pages without benefit. For the artist, more especially, there are pictures of the highest import and most entrancing beauty; they rise at every instant to his delighted gaze. Nor is this all, or even the most important and valuable portion of the advantage to be obtained by the study of that divine writer: the least impressionable finds himself influenced by the purity of his spirit, and the warmth of his feeling; the most obstinate must needs yield to the force of his reasoning, the most refractory cannot refuse to be amended by the gentle compulsion of that heart-inspired and heart-appealing* eloquence, which in his pages constantly enforces lessons ever tending to the right and good.

To cite two short poems only, the "Words of Belief," and the "Words of Error;"† where else will you find truth so full and glorious in words so few, yet so effective? Read but these only, and be sure that if they should chance to be the first of your acquaintance with their immortal author, they will by no means be the last of your study in his works.

Leaving these, nevertheless, for the present, let us turn to "The Cranes of Ibycus;"‡ and if you reproduce on your canvas the effective picture given in the stanzas, you will perform a work that can scarcely fail to satisfy even yourself. The story may be told very briefly to such as yet remain unacquainted with its details.

Murdered in the groves of Neptune, while on his way to take part in the games of Corinth, Ibycus, the beloved of Apollo, invokes a flight of Cranes, which alone are witness of the deed, to avenge his fate. His mangled remains are found by the grieving Corinthians, who decree vengeance on his destroyers.

* "Would you touch the hearts of others,
First your own must feel the glow."
Ludwig, *ex-king of Bavaria.*

† "Die Worte des Glaubens," "Die Worte des Wahns."

‡ "Die Kraniche des Ibykus."

All are assembled in the theatre—the chorus enters, and here commences your portion of the work. You have the open theatre with its crowding masses, before whom the chorus:—

"Streng und ernst, nach alter Sitte,
Mit langsam abgemessnem Schritte,
Hervortritt aus dem Hintergrund,
Umwandelnd des Theaters Rund:
So schreiten keine erd'schen Weiber;
Die zeugete kein sterblich Haus;
Es steigt das Riesenmasz des Leiber,
Hoch über menschliches hinaus.
"Ein schwarzer Mantel schlägt die Lenden;
Sie schwingen in entfleischten Händen,
Der Fackel düsterrothe Glut;
In ihren Wangen flieszt kein Blut;
Und wo die Haare lieblich flattern,
Um Menschenstirnen freundlich wehn;
Da sieht man Schlangen hier und Nattern.
Die giftgeschwollnen Baüche blähn."

Thus faithfully and efficiently translated by Sir Edward Bulwer Lytton:—

"True the awful rites of old,
In long and measured strides, behold
The chorus from the hinder ground,
Pace the vast circle's solemn round.
So this world's women never strode,
Their race from mortals ne'er began—
Gigantic, from their grim abode,
They tower above the sons of man!

"Across their loins their dark robe clinging,
In fleshless hands the torches swinging,
Now to and fro with dark red glow,
No blood that lives the red cheeks know!
Where flow the locks that woo to love
On *human* temples, ghastly dwell
The serpents, coil'd the brow above,
And the green asps with poison swell."§

Pacing around the circle as here described, the awful "Daughters of Night," having announced their avenging power in a hymn of great solemnity, for which I have not space, are disappearing in the background, when across the open space of the roof comes sudden darkness, proceeding from the flock of

"*The slow cranes, hoarse murmuring,*"

that just then pass over. A voice is instantly heard to proceed from the countless masses:—

"Behold! behold, Timotheus,
See there—the cranes of Ibycus!"

are the fateful words it utters, and the crime of the speaker stands revealed. In vain would the murderer retract his words; his white and quivering lips complete the confession he would so fain recall. The audience, well prepared for the awakening of his conscience by the hymn of the chorus, rise—an imposing mass—declaring as one man—

"The truth we seize!
Thy might is here, Eumenides!

"The murderer yields himself, confest;
Vengeance is near, that voice the token.
'Ho! him who yonder spoke arrest,
And him to whom the words were spoken!'"||

This is done, and "dark unwitnessed crime," to borrow from the same translator, is "struck by the lightning that revealed." Your moment for this work you will have no difficulty in choosing, and may cause it to serve, as does the whole poem, remarks Sir Edward, to illustrate furthermore those lines where Schiller declares in his "Artists"—

"Secret murder, pale and shuddering, sees,
Sweep o'er the stage the stern Eumenides;
Owns, where law fails, what powers to Art belong,
And, screened from justice, finds its doom in song."¶

"There is a curious piece of traditionary superstition connect-

§ "The Poems of Fredrich von Schiller." Translated by Sir Edward Bulwer Lytton.

|| Sir Edward Bulwer Lytton, *ut supra.*

¶ Sir E. B. Lytton's Translation.

ed with Bruce and Bannockburn," says Alexander Fraser Tytler, in a note to his Lives of Scottish Worthies; "but this, as it was not to be found in Fordun or Winton, I have omitted from the text."

"Perhaps I have done wrong," he adds, "since the circumstance is characteristic of the times." And he would have "done wrong" without doubt, the excellent writer, had he persisted in his exclusion of the story; but he has happily repented him of the evil in good time, and for your comfort and mine, O painters, has inserted the legend in that chapter of Antiquarian Illustrations which he has appended to his work. There the reader who may desire to read more will find it: the words, so far as they seem to be required for our purpose, are these:—

"Our story relates to an alleged miracle regarding the luminous arm of St. Fillan, who has given his name to many chapels and holy fountains in various parts of Scotland. Cameronius tells us that he was Abbot of Pittenweem, but afterwards retired to the wild and romantic district of Glenorquhay, where he died a hermit in the year 649. The legend asserts that when engaged in transcribing the Scriptures, he was compelled to desist from his labors for lack of light; but while grieving over this circumstance, he suddenly found that his left hand and arm emitted a supernatural effulgence, by which, without either torch or candle, he was enabled to proceed at midnight as at mid-day.

"This luminous arm was ever afterward preserved as a relic; and Bruce, who neglected nothing that might give confidence to his soldiers—nay, whose own mind was probably not insensible to the influence of the legend—carried it with him, enclosed in its silver shrine, to Bannockburn.

"But the king's chaplain, fearing lest that precious relic might fall into the hands of the English, or be otherwise lost, abstracted it secretly from the tent of the king, wherein he left nothing appertaining to the saint, save only his silver shrine.

"On the night preceding the battle, Robert, whose mind was filled with anxiety, could not compose himself to sleep, but passed the hours in earnest supplication to the saint, whose arm he believed to be shut up within the reliquary. Suddenly, and after long prostration of mind and body, a more than ordinary light appeared to fill the tent, and looking up, the Bruce perceived an arm extended above his head, and in the act of withdrawing itself from the shrine, the door of which stood open. Starting to his feet, in the belief of some bold robber was attacking the sacred deposit, he beheld the refulgent arm reposing within its jewelled receptacle, the doors whereof were even then closing slowly, of their own movement, as the astonished king gazed on them in awe and wonder. Turning then to examine if any man were concealed in the tent, the Bruce beheld a majestic form in the entrance of the pavilion. This *appearance* was in the act of departing, yet Robert recognised St. Fillan by the portrait of that holy archbishop, suspended over the altar of his oratory. Being strictly questioned, the chaplain subsequently confessed what he had done, when Bruce could no longer doubt that the saint had restored his arm to the shrine as an assurance of victory: the result of the battle, decisive as it was, the complete triumphs of the Scots, and the flight of Edward to Dunbar, could not fail to confirm his conviction."

To the Scottish artist, more especially, this tradition of the Bruce can scarcely fail to offer an attractive subject for his pencil, although we do not remember to have seen it chosen by any one of them; yet there may be more than one who has done so—seeing that the works of Tytler are deservedly popular, and are in the hands of all who read.

We are not so good, we dear people of this excellent world, but that some day or other we may find it possible to make ourselves better; and one means of that desirable result is assuredly in the hands of the painters. Let them but set before our eyes the presentment of such things as any one among us may do towards "being good," as nurses say to the children, and the glow that one cannot but feel at heart when some great and noble action stand confessed and clear before us, may do something towards helping forward the result whereat we have just hinted. Nay, there does not always need even so much to wake up the ready sympathies of our better nature; and here, in few words, is a proof that he who does but obey an impulse, provided it be a pure and upright one, will, in so far, serve as "the electric chain wherewith" the hearts of others may, for the moment, at least, be aroused to the love and appreciation of the good and right.

In the early part of the year 1760, Commodore Thurot, an officer in the service of France, then at war with England, threw himself on the coast of Ireland, entered Carrickfergus by surprise, and for some short time was master of the town. While the French troops and those of the small garrison were then fighting in the streets, a little Irish child, unconscious of its danger, ran between the two parties just as each, having drawn off for a moment to reload and prepare, had commenced the renewal of the carnage. Perceiving the presence of the infant, and moved to compassion by its innocence, a French grenadier cast down his musket, rushed into the midst of the fire, caught the child in his arms, sprang with his charge towards the shrieking mother, who, discovering her loss, was hastening to seek the boy, and having placed him within the porch of a neighboring house, whence the terrified woman could take him without peril to either, he hurried back to his place amidst the loud shouts of all who, on either side, beheld his humane action.

Many a deed of admirable humanity, as well as heroic bravery, you will doubtless find recorded in the annals of the late war: paint them all then, for we can scarcely have too many such; but do not refuse to let this also stand beside them—there will be room for the whole, whether on the walls of our galleries or in our hearts, do not doubt it.

Again, if in some dark day we should any of us feel more than commonly disposed to evil, here is a prescription that, if we be not wholly incorrigible, may go far to cure us of the malady. It is a pilgrimage to Lea Hurst—the home in youth, if not the birth-place, of one whose name can never henceforth be uttered in any land, but that a throb of pride, as well as a warm feeling of respect and affection, must rise spontaneously in the heart of every Englishman who shall hear the sound. Nay, we have no longer the sole property in that revered name; the virtue of her who bears it have made her an object of love and reverence to men of all nations—all claim part in her as in one who has exalted humanity—dwellers in every land are uniting to do her honor; and if those so late our enemies still look doubtfully on the mass of our country-people, they make an exception in her favor. Even the Muscovite raises his rude cap from his brows, as he would before the Panagia,* when he hears that sweet and heart-warming music, the name of Florence Nightingale; that angel of mercy, for the sight of whose very shadow the sick man kept hourly vigil, and at whose approach he who lay deprived of half his members, strove to lift his mutilated form that he might look upon her.

The domain of Emblay House, in the varied and beautiful county of Hants, may likewise claim some interest in this admirable lady; and far be it from us to neglect the justly prized rights of any, in a possession so deservedly valued; but it is with Lea Hurst, in Derbyshire, that we have now to do, and if the landscape-painter should, "go in search of beauty," he too, no less than the worshipper of the morally beautiful, may find all that even his fancy can set before him in the delightful region wherein the mansion and domain are situated.

The building is of the Elizabethan style; its stone mullioned windows opening beneath many gables, and the substantial clusters of chimney-stacks rising from its roofs, giving promise of abundant hospitality; the pleasant gardens and shrubberies are enclosed within a wide-extending park, whence delightful views of a country richly diversified with hill and valley, wood and stream, gorgeously tinted rocks and emerald fields, present themselves at all points. "The Druid-crowned Riber," with the bold hills around and beyond Matlock, are perhaps among the most prominent. Scarthin Nick and the heights beyond

* The Panagia is the Virgin of the Greek Church.

Cromford are also to be seen from the park. It is, indeed, a place not unlikely to have assisted in the development of a pure and holy creature; for what is there so elevating, morally or intellectually, as the perpetual contemplation of great natural beauty? what so well calculated to foster the nobler impulses, to awaken the more generous sympathies, to produce, at a word, that large-hearted beneficence which has given to the subject of our present remarks that first place among women certainly now occupied by Miss Nightingale, as a constant abode in the visible presence of Him who has made us all? and this privilege is without doubt secured to the fortunate possessor of a home placed and formed as is Lea Hurst.

We do not repeat any one of the many anecdotes now current in society, and become "familiar in the mouths" of all, that might be adduced in exemplification of the remarks here made; your memory will supply you with such most amply, to say nothing of the many that cannot fail to be added to your store, whether your choice be the "faire manor-house in Hampshire," or the beautiful Lea Hurst.

Much has been said, much written, and perhaps some little painted—although scarcely so much as might be desired—of our beautiful cathedral churches; nor has the noble metropole of Canterbury failed to obtain its share of notice. But within a mile of that structure is one which has scarcely been "marked of the painter," although few better merit his attention. The fane to which we allude is the more lowly Church of St. Martin; and there are those who maintain that this is the very building described by the venerable Bede, when he relates the fact that "in a church dedicated to the honor of St. Martin, and built while the Romans were still in our island, did Bertha, the queen, resort to hear mass and pray, until Ethelbert her husband, being converted to the faith of Christ, endowed his teachers with a settled place in this metropolis of Canterbury, bestowing on them at the same time all needful muniments, and permitting them to preach freely, wheresoever it might seem good to them."

Many proofs of its high antiquity will be found in the Church of St. Martin, by the artist who may desire to present us with a memorial of our first Christian king, for the baptism of Ethelbert is believed to have been received from its font, without doubt one of the first made in England Other circumstances of interest attach themselves to the church: it was here that St. Augustine uttered his earliest exhortations to the people of Canterbury; here that the excellent Queen Bertha had her oratory; and here that they still reverently exhibit her tomb. To him whose heart and mind are attuned to the subject, not one of these will be without significance; and if, since the interior, although perfect in its exquisite restoration of an ancient oratory, *is* a restoration, he should feel chilled by the evidences of that fact presented within, let him betake himself to the pleasant churchyard without the building; the proud towers and aspiring pinnacles of the vast cathedral, though visible from that gentle eminence, need not too forcibly distract his attention from the primitive St. Martin, with its low square tower darkly mantled in luxuriant ivy: reverend yew-trees offer him their shade of ages, the purple glow of sunset shall enrich the landscape to his utmost desire, or the silvery morning sunlight, newly beaming from the dawn, shall come stealing softly over the rich green sward, where it slopes gracefully to the plain beneath. Should he then need further inspiration for that scene of past days,—which he cannot but meditate reproducing for us, as he makes all the beauteous picture his own, while reclining beneath those majestic witnesses of an older age, the century-crowned trees that bend their broad arms over him,—let him read what Wordsworth has said concerning the place, and he can scarcely fail to find it:—

> "For ever hallowed be this morning fair,
> Blest be the unconscious shore on which ye tread,
> And blest the silver Cross, which ye instead
> Of martial banner in procession bear;
> The Cross preceding him who floats in air—
> The pictured Saviour. By Agustine led,
> They come, and onward travel without dread,
> Chanting in barbarous ears a tuneful prayer,
> Sung for themselves and those whom they would free.
> Rich conquest waits them: the tempestuous sea
> Of Ignorance that ran so rough and high,
> And heeded not the voice of clashing swords,
> Those good men humble by a few bare words,
> And calm with fear of God's divinity."

Who that has haunted picture-galleries, whether at home or abroad, but must have remarked the eager interest with which all crowd round the artist having a story to tell—more especially if he tell it ably. This was done to some extent, a few years since, in respect to "Travelling in the Olden Time," by one of our living artists; but there is ample room for another—not to say for many another—laborer in the same field; and if he who may enter on this pleasant avocation, do not find that he has wiled all observers from the "Portrait of a Gentleman," and even "Portrait of a Lady" painters—to say nothing of many another—why then "*j'y perds mon Latin*," but he will, and never doubt it. For whether he take Stow's "long waggon" of two hundred and seventy years since, then in the fiftieth year of their existence, or thereabouts, or give us the "flying coaches" of a later period, ambitiously aspiring to rush on at the frantic rate of "four miles in the hour," he has but faithfully to delineate "life in travel," as the annalist and wayfarer of the period have described it—boasting its advance, or bemoaning its evils, each according to his humor—and he will produce a picture well worthy to be painted in these present times, were it only as a memorial of what must else be forgotten.

For the string of packhorses, winding gravely their laborious way across vast undulating moorlands, a thick mist falling heavily, and the carriers puzzled to discern the track, there might be a claim put forward; and if a disconsolate passenger were added, doing penance between the two packs of a horse, as he wends to seek his fortune in that London whose streets were then paved with gold, there would be all the more room for the delineation of character. Or permit the moment to be a more genial one: let the sun be shining cheerily, and the vigorous train sweeping joyously forward through the fair bright uplands on a gladsome morn of May: there be those of our artists who would give us to hear the very chime of their bells as they pass; and who can marvel, though the peasant maidens, depicted for us as meeting that train by the way, do linger long to behold its bravery? How lovely are they, those sweets maids of England! but alack the while, how completely deaf to the words of their matronly companion! She is doubtless warning them of dangers that may lurk in such glances as the bold drivers are bending on their beauty—but they heed her not a jot: alas, and woe is me!

Or say that you care but little for packhorses—then, though differing from you widely, let us beg of you to look at this "coach" of some hundred and eighty years back, as described by various writers of that day. "It wears two boots," says John Taylor, the water-poet; "two boots, but no spurs—nay, sometimes it hath two pair of legs in each one of these boots; and oftentimes, against nature, most preposterously doth it make fair ladies wear the boot. Moreover, people who ride therein are forced to imitate sea-crabs, and go sideways, as do all men who sit in the boot of a coach."

Mr. Charles Knight tells us that these boots were uncovered seats "projecting from each side of the carriage;" and hearing this, one can scarcely marvel that a writer quoted by him, as travelling in this contrivance, should declare his journey to have been "noways pleasant." "For," says he, "I was forced to ride sidelong in the boot all the way; and this travel hath so much indisposed me, that I am resolved never to ride up again in the couch." Even the dignity of his companions does not appear to have consoled our traveller, since he announces this resolution after having recorded that "the company that came up" with him were "persons of great quality, as knights and ladies." *

Neither were the roads of those days altogether irreproacha-

* See "Pictorial Half-hours," vol. i. p. 56.

ble of character; and to a second complaintment, writing in the latter part of the seventeenth century, asks piteously in reference to them and to the coaches:—

Is it for a man's health to exchange the convenient fashion of travelling on horseback, for this weary cumber of sitting behind tired jades, who do not seldom lay him fast in the foul ways, whereby he is forced to wade up to the knees in mire, and then to abide in the cold until horses can be found to pull the coach out? Is it for his health to sit, long shaken in a rotten box, to have his tackle, perch, or axletree broken; wait half a day to have it mended, and then journey all the night to make good his stage?"

Perhaps not; but our grumbler may have found consolation in the merry supper eaten nightly at his inn, during the fourteen halts of "a quick passage" between York and London; or if not, the painter who shall desire to preserve for us a lasting memory of those times, may find something germane to the matter, in this singular contrast to our railway doings of the present day, when we all pass prosaically from our English capital to that of Scotland within the narrow limits of some short twelve hours.

THE AMBROTYPE—GIBBS vs. SIMONS.

Richmond, Va., *June 28th*, 1856.

To the Editor of the Photographic & Fine Art Journal:

Sir:—Mr. P. E. Gibbs, ambrotypist of this city, whose counsel I was and am in the case of Gibbs vs. Simons, in the United Staes District Court for the Eastern District of Va., has shown me a book published by N. G. Burgess in New York, 1856, called the Ambrotype Manual. On page 126 of this book, appears the following:—"How far Mr. Cutting can sustain his claim to the use of Canada balsam, remains to be seen. A *decisedi* has already been given in the U. S. District Court of Virginia, in the case of Gibbs vs. Simons, where the Judge ruled that the *principle* was not a subject for a patent, and therefore could not be sustained. The injunction was not granted." On page 130, is the following extract of a letter from M. P. Simons, Richmond, Va., to the Editor of the Photographic and Fine Art Journal:—"Mr. Cutting admits that microscopic slides and lenses have been sealed with balsam, but remains perfectly silent upon the subject, that daguerreotypes have also been sealed with balsam in a similar manner, a fact which was proved in court to the satisfaction of all, except the patent man and his counsel, by a little book called 'Hints on the Daguerreotype;' published in 1853, by Carey & Hart, Phil."

Now, so far as Mr. Simons is concerned, a controversy with him would be too small game for me; and I *know* he knows, he never will attempt one with me of any sort. But justice to Mr. Gibbs, to the public who may be misled, and to truth which has been violated, compels me to say that, except that such a cause *is pending* and *nndetermined* in the said court, the whole story is a shear fabrication of Simons himself. He either cannot or will not understand the truth in the premises.

The facts are these:—A bill was filed in the said court praying an injunction to stop Simons from infringing Cutting's Patent, of which Gibbs was assigneo. A day was fixed for the hearing—counsel appointed on both sides—evidence was heard—and arguments were made. The counsel for Simons insisting (upon alettioutres cited), that there should be in all such cases, a verdict of a jury before the granting of an injunction. To this the counsel assented to this extent, viz. that if the Judge had any doubt about the facts, or if the facts themselves were of a special and technical character, it would be proper for him to order a jury trial. This and this only the judge determined to do, as the record seen by me to-day in the presence of the clerk and two disinterested gentlemen will show. The judge passed upon no facts, expressed no opinion, except on the point stated, discussed no principle, and settled none involved in the case. Nothing was settled to the satisfaction of *any body*, except Simons, who rejoiced at the delay, as it gave him longer time to violate the patent. The bill of injunction and suit at law, are *both pending*, and will be tried at the next term of the court in October.

I am, Sir, very respectfully, yours,
A. Judson Crane,
Counsel for P. E. Gibbs, Richmond, Va.

From the London Art Journal.

PHOTOGALVANOGRAPHY; OR, ENGRAVING BY LIGHT AND ELECTRICITY.

Photogalvanography is the name of a process, invented by Mr. Paul Pretsch, the late manager of the Imperial and Government printing-office at Vienna. The maniplatory details by which the copper plate, with its photographic representations, is produced, have been obligingly shown and explained to us: the results are so very different from anything which has hitherto been produced, they are of such exceeding promise, and the process involves so many interesting particulars, that we have resolved on giving the readers of the *Art Journal* some account of an art which cannot fail to be of importance

One of the points toward which attention has been constantly directed, the discovery of the process by which the solar rays were made to delineate external objects upon chemically prepared tablets, has been the invention of some mode by which those impressed tablets could be easily employed to multiply the original image. Several methods have been introduced from time to time—each of them of more or less promise—although up to the present day it does not appear that any have been entirely successful.

We have seen *heliographs*—as the pictures by M. Niepce were called—etched, and some tolerably successful experiments have been made, by electro-chemical and simple chemical action, to *bite* into the silver surface of the daguerreotype plate. Mr. Henry Fox Talbot patented a process by which etchings were obtained upon steel plates; but all these differ in many estential particulars from the process of photogalvanography. In order to render our description of this new and important invention complete, it is necessary that we sketch out briefly what has been done in this direction. Niepce's *heliographs*, as they were amongst the earliest photographic efforts, claim our first attention. Bitumen of Judea, in some cases softened by combination with a little of the essential oil of lavender, was spread uniformly over a plate of metal, which was then warmed, so that the essential oil evaporating, a very smooth surface of resin covered the plate. The object which he desired to copy was placed upon this prepared plate in an ordinary copying frame, and it was exposed to the sunshine, or the sensitive plate was placed in the camera-obscura until the images of exterual objects were impressed upon it. On account of the slowness with which the change takes place on the resin, several hours exposure in the camera obscura were required, and hence, from the alteration of the shadows during this prolonged period, the pictures were defective.

By exposing this bitumen, or any resinous surface to the action of the solar rays it is rendered more or less soluble accordding to the character of the agent employed. If, therefore, after exposure, the heliographic plate is subjected to the action of a solvent, one portion will be removed, while the other part will remain untouched. The resulting picture is therefore produced by the contrast between the resinous surface and the metallic plate, from which the resin has been removed. It will be evident to all that the result thus obtained is, in fact, that of an ordinary etching surface, except that the resin has been removed by the action of the solar rays, and a solvent, instead of by the etching needle. If an acid is now poured upon the metal plate, it *bites* into the metal, and the result is an etching from which prints can be taken. The great defect of those productions was, that the high lights and the deep shadows were alone represented. In the experiments which have been made within the last few years, these defects have not been overcome. Some results obtained upon lithographic stones, through the medium of this process, have been of greater promise. M. Lematre

has done much towards improving Niepce; but owing to the imperfections already indicated, it it has not yet been successfully applied to any useful end.

The Dagurreotype picture is produced by the deposit of mercurial vapor, which combines with the silver, and the polished surface of the silver surface itself. As the electro-chemical relations of these two metals are disimilar, it was thought that the Dagurreotype plate, could be etched by the agency of the voltaic battery. Dr. Berres, of Vienna, M. Fitzeau, in France, and Mr. Grove, in England, succeeded, either by direct chemical action, or by electro-chemical processes, in engraving these plates, and in many examples the details were preserved in a very charming manner. Mr. Claudet was very successful in engraving the Daguerreotype picture by a modification of the process of M. Fizeau. We have now before us some copies printed from those plates, consisting of images of anatomical preparations, of portraits, representations of statues, which are curious examples of the perfection obtained at a very early period in this art.

The next step in progress was the process patented by Mr. Talbot in 1853. This process consisted in spreading upon a steel plate a solution of isinglass or gelatine, in which had been previously dissolved some bichromate of potash. The plate being dried by warmth sufficient to coagulate the gelatine, the object to be copied is placed upon this tablet in the copying frame, and then exposed to sunshine. A curious change takes place during this exposure; one equivalent of chromic acid is liberated from the potash, and this combining with the gelatine, it is rendered insoluble. After exposure, the plate is placed in water, and all those parts which were protected from the action of the solar rays are dissolved out. The picture is now formed by the yellow brown combination, of the gelatine and chromic acid, and the steel from which the coating has been removed. There is much of interest in this stage of the process; and the author says; "If the plate is examined in this state, it appears coated with gelatine of a yellowish brown color, and impressed with a white photographic image, which is often eminently beautiful, owing to the circumstance of its being raised above the level of the plate by the action of the water. Thus, for instance, the image of a piece of black lace looks like a real piece of very delicate white lace of a similar pattern, closely adhering to, but plainly raised above the brown and polished surface of the plate, which serves to display it very beautifully. At other times the white image of an object offers a varying display of light, when examined by the light of a single candle, which indicates a peculiar molecular arrangement in the particles of a gelatine. These photographic images are often so beautiful that the operator feels almost reluctant to destroy them by continuing the process for engraving the plate."

The subsequent engraving process is essentially an etching operation. Bichloride of platinum, diluted with water, is poured over the plate, and as the gelatine exists in different degrees of thickness over its surface, the action is first established through the thinner films. The acid bites into the steel, and, by carefully watching the result, a very pleasing engraving on the steel may be obtained, which prints well. Fern leaves, grasses, pieces of lace, and objects of a like description, may be copied in a very pleasing manner by this process of Mr. Talbot. It is but justice to Mr. Mungo Ponton to state that that gentleman, in 1838, first directed attention to the peculiar changes which the bichromate of potash undergoes when it is exposed, in connection with organic matter, to the action of the solar rays. Subsequently, the writer of the present paper, in 1843, used this salt, combined with the sulphate of copper and nitrate of silver, in the production of positive pictures by one process—this process is known as the *chromatype*.

We must now advance to an examination of Mr. Pretsch's process. It will be evident in what respect it resembles, and in what it differs from the inventions we have already described. A plate of glass is thoroughly well cleaned. A quantity of glue is dissolved, and three different solutions are made, which we will number respectively:—1. Nitrate of silver; 2. iodide of potassium; 3. bichromate of potash. To each of these some of the glue is added; the largest portion to the solution No. 3, then No. 2 is added to No. 3, and both solutions mixed together. The previously yellow solution becomes a fine red, from the formation of chromate of silver, which is held in suspension. Solution No. 2 is now added to the mixture of 1 and 3; the mixture loses color slightly, but it still remains of a fine red color. This mixture, which involves some very curious chemical phenomena, is poured over the glass plate, and by skilful manipulation, a perfectly uniform film of a red color is produced. This part of the process is performed in a room illuminated with yellow light, and maintained at a tolerably high temperature. When solidified, the plate is fit for use. A photographic view, a portrait, of an ordinary engraving is placed upon the gelatine tablet, this arrangement is fixed in the copying frame, and duly exposed to the solar rays. In the course of a short time all the exposed parts blacken to a fine brown, and the lines beneath the supposed photograph or print are darkened or preserved from change, as the case may be, until eventually a copy is obtained the reverse of the original. All the dark lines, or portions of a print or of a photograph remain unchanged, all the light lines or portion darken—the degree of darkening being determined by the relative transparancy of the several parts.

The glass plate is, at the proper time, taken from the copying frame and plunged into water. The picture is now percieved to be gradually developing itself with extraordinary beauty. All the unchanged portions of the plate are rapidly dissolved off, and consequently the picture is produced not merely by differences in the color of the surface, but by variations in the thickness, corresponding with the amount of actinic action which has taken place during the exposure of the plate.

When the proper effect is obtained the process is stopped, the surface is dried off with blotting paper, and the plate preserved for the subsequent manipulation. It will be understood that the chromic acid of the bichromate of potash at the moment of seperating from that salt, when the actinic change is effected, combines with the gelatine, and renders it insoluble. Hence in the picture we have several thicknesses of the gelatine film, representing the lights, the middle tones, and the deep shadows, with all the beautiful gradations between these which are obtained in a highly finished collodion photograph.

This constitutes the photographic part of the process of Mr. Pretsch, the remainder of the manipulation being the preparation for, and the carrying out of, the electro-chemical preparation of the copper plate, from which the photogalvanographs are to be printed. The photograph being placed upon a firm bed, a sheet of elastic gutta percha is spread over it, and subjected to some pressure; this receives a very perfect impression of the picture, all the lines, howsoever delicate, being faithfully preserved. When this hardens, its surface is prepared so as to render it conducting, and it is then subjected to the ordinary electrotype process; being placed in a cell filled with sulphate of copper, and connected with a plate of zinc in a porous cell excited with dilute sulphuric acid. Thus a sheet of fine copper is precipitated upon the mould, and a plate, the reverse of the mould, is obtained. It will be evident to our readers that we are thus enabled to obtain either a raised image or an engraved impression. At present, the processes for printing from plates *in relief* are not sufficiently perfect, but the prints taken from the engraved plates are in a very perfect condition. In these, for the first time, we see all the minute details represented, with the half-tones as finely given as the high lights or the shadows.

In the establishment at Holloway, arrangements are made for carrying out Mr. Paul Pretsch's patent commercially upon a large scale; and from the specimens we have examined, we are satisfied that the productions of the camera-obscura must soon be commonly employed for all purposes of illustration.

We have heard much of the fading of photographs; we have repeatedly stated our conviction, the result of upwards of sixteen years' experience, that photographic pictures need not necessarily fade. Where they do fade—and we know that some of the finest works which have been produced have rapidly perished, or are perishing—it is due to imperfect manipulation. Much of the deterioration is due to the practice, as it is called, of *toning*.

By this practice agents are introduced into the paper which act slowly but surely upon the silver of the the photograph, and eventually effect the destructive change. Every condition of tone can be produced without any of these *toning* agents, by the use of different chlorides in the preparation of the paper upon which the positive print is obtained. Photo-galvanography, however, relieves us from the risk of possessing in the highest degree the perfection of the original photograph, and the permanence of a copper-plate print. R. Hunt.

NOTES OF A TRIP TO EUROPE.—No. 6.

Friend Snelling:—In my last, I continued my journey from Marseilles to Florence, or as the Italians call it, Firenza, in which city I passed a week, enjoying the beauty of the surrounding scenery and dwelling amidst the sublime productions of Art —for there is no city in the world richer in art treasures than Florence—for the power and wealth of many of the ancient families, conspicuous amongst whom was that of the Medicei, called around them the genius of Italy to add to the splendor of their reign; but all these mighty rulers have passed away, but they have left an heritage of Art whose influence will be eternal. The city itself is quite picturesque, situated as it is on both sides of the Arno, which is spanned by a number of bridges, conspicuous amongst which is a beautiful modern suspension bridge ; it looks somewhat out of place in contrast with its ancient neighbors. Throughout the city there are many fine stately buildings—the churches are most of them unfinished on the exterior and I suppose will remain in that condition, though the interior of most of them are full of fine paintings and monumental tombs—the cathedral is a large massive building, the design of the body of the church was executed by Arnolf; the vast dome that surrounds it was planned by Brunelleschi, and is said to have been the pattern from which Michael Angelo formed that of St. Peters at Rome; the church is singular in its finish, the exterior is covered with bands of different colored marbles. Near the church but not attached, rises the Campanile or bell tower, which was designed by Giotti; it is ornamented by statuary and bass-relievos; the ascent to the top is by a flight of 414 steps, the view from which is most delightful. Directly in front of the cathedral is the church of San Giovanni, which has a world-wide reputation for its famous bronze doors; those—by Gheberti—so charmed Michael Angelo that he pronounced them worthy to be the gates of Paradise; they are really most beautiful in their design and wonderful in execution. In the church of San Lorenzo, may be seen the tombs of the families of the Medici—by Angelo—they are pronounced as the finest works of this great sculptor; they are full of deep thought, powerful conception, and a wonderful knowledge of the principles of art. No student or lover of art should ever visit Florence, without dwelling upon those masterly productions. Many of the other churches contain fine works by great masters, but it would be tedious to enumerate them, for they must be seen to be fully understood. There are many private galleries of paintings that are open to visitors; but the two principal collections are those at the Ducal Palace, and the gallery of the Uffizi, either of which is worth a visit to Europe to behold: they are both open to the public daily; they are somewhat different—that of the Uffizi being a collection from the earliest masters chronologically arranged; while the Ducal collection is a selection of genius from all the great masters. I could not give any idea of what is to be seen in either collection, but it was to me unbounded pleasure to behold the production of Titian, Angelo, Raphael, Corregio, Da Vinci, and a host of others; but the gem of the whole collection—to which I returned again and again to gaze upon—was the Madonna Della Seggiola of Raphael. Although from childhood I have been familiar with its form by the numberless representations, to the original alone belongs that heavenly expression of the virgin as she embraces the infant Saviour; well might he be named the Divine Raphael; one cannot behold the evidence of his power without a regret that death so early called him from his labours. As you enter the Uffizi collection you pass by the Soggia dei Sanzi, where is situated the famous Perseus in bronze by Benevenuto Cellini, and the marble group of the Rape of the Sabines, by John of Bologna. After entering the gallery, I passed through room after room, and corridor after corridor, where upon all sides were placed works of art—a perfect history of art and artists. In the Hall of Norte, I dwelt for some time upon the agony there depicted until one almost fancied the marble endowed with life. In the saloon of bronzes there is much to admire, and so on from one portion to the other. I at last arrived at the inner temple, the holy of holies,—the saloon called the Tribune,—drawing aside the curtain I entered; there before me stood the Venus de Medici; to describe its manifold excellencies would require a mightier pen than mine, but it is certain that none, let them be ever so deficient in the principles of art, could contemplate the graceful attitude and well turned limb, without feeling that it was a work of more than ordinary excellence. By its side is the group of the wrestlers and the dancing fawn, both grand works; while upon the walls are placed as fit companions, the famed Titian Venus, the Fornarina, by Raphael, and other works of like excellence. Day after day I visited this gallery, and ever saw new beauties, until one loathes to quit a spot so charming. I called on some of the resident artists, amongst whom was Hiram Powers the sculptor; I found him in his studio surrounded with the works of his creation. I did not know which to admire the most, the man or his works; but there is one thing certain, it makes one feel proud in knowing he is an American. His latest production is a statue of California; it has been purchased by Wm. B. Astor of your city. I do not think it equal either to his Eve or Greek Slave, yet it is very beautiful.

The weather was delightful; in the evening I usually wandered upon the banks of the quiet Arno, or seated myself upon one of the bridges and watched the passers-by, while the gentle moon gave beauty to the scene. My limited time soon passed by, and I was obliged to bid farewell to Florence and all her pictured treasures which henceforth will live in memory. It was about 5 o'clock in the afternoon on the 15th of July, when I took my station upon the coach which was to convey me to the depot. I went in the cars as far as Sienna, where we arrived after nightfall, so I could see but little of this ancient city; from Sienna to Rome I took the post coach, it was near midnight when we left the city. I found I was the only passenger; I felt some little uneasiness as the country through which we had to pass, was very much infested with the banditi; only a few days before, the coach had been overhauled; but I soon was lost in sleep and all was forgotten. The following day we journeyed on, and for the first part of the road it was through a desolate country, but after entering the Papal States it presented a better soil. It was night when we entered the Campania, so the imperial city was shut out from view. It was after midnight when the pouderous vehicle halted at the gates of Rome; it was sometime ere we could wake the guard, who slowly opened the massive portals. And thus your humble servant entered the renowned city, once proud mistress of the world.

> "Ah! little thought I when in school I sate,
> A school-boy on his bench, at early dawn
> Glowing with Roman story, I should live
> To tread the Appian———"

F. D. B. Richards.

Photography under Water.—An Englishman by the name of Thompson, recently took a very good photograph of the rocks and weeds at the bottom of Weymouth Bay, in England. He placed his camera obscura in a box, with plate glass front and moveable shutter, to be drawn up as soon as the camera had been sunk to the bottom. The apparatus was then let down from a boat, carrying with it the collodion plate, prepared in the ordinary way. When at the bottom, the shutter of the box was raised and the plate exposed for a period of ten minutes with a successful result. It is believed that this method will prove a ready and inexpensive means of arriving at a knowledge of the conditions of piers, bridges, piles, structures and rocks under water.

THE HILLOTYPE.

Utica, *July* 21*st*, 1856.

Friend Snelling—*Dear Sir:*—Through the politeness of my friend Marquis, I am in possession of the Rev. L. L. Hill's late circular. If that most noble divine practised the code that his profession requires him to preach, *if he loved his enemies*, my sight for an early perusal of his *valuable* documents would be much better than under present circumstanes, inasmuch as I am charged by Mr. Hill with having done him injustice as regards his natural colors; and having a desire now, since his discovery is perfected and has passed into the hands of a second party, to square off with him, I wish, through your Jourual, to make due acknowledgments to Mr. H., and if my opposition to his discovery has in any way robbed literature, science, or art, when I die, the noble fraternity may bury me at the foot of the Westkill mountains, and erect a slab with the following epitaph photographed upon it:—

"Here lies old ——— at the foot of *the* hill,
He died with the gout at his own good will."

Unfortunately since the first announcement of Mr. Hill's wonderful discovery, I have been a firm disbeliever in its reality, practicability or possibility. Until since my perusal of his late circular, I have supposed that 1 must be added to 2 in order to make 3, but now I am convinced that 2 and 0 will make 3 quite as well according to said circular. I now see my error, and am instructed by my conscience to prostrate myself at the feet of *the* Franklin of the age, *the* genius of combined worlds, *the* helion Raphael. I hope to be able to express myself so as to be closely understood; therefore allow me to preface my humble drawback by a remark, that from my commencement of *free* thinking and free speaking upon the subject of natural colors, my opposition has been to the measure and not to the man. I have, until since my perusal of Hill's late circular, believed that color was substance, and since the optic lens gives only a shadow or prismatic reflection of color which is not substance, how chemical agents could be combined with nothing so as to produce a most wonderful affinity and remarkable change, I never have been able to understand until now; I am fully convinced and satisfied with Dr. Hill's explanation. I have known for a long time that the composition of yellow and blue produces green, but I must acknowledge my indebtedness to the Dr. for the theory of producing a beautiful and permanent green, by reflecting the shadow of a given quantity of blue into or *"onto"* a given quantity of yellow, and now I am not quite sure that the Dr. is correct, and will occupy my first leisure moments searching philosophy, chemistry, and Dr. Townsend's medical almanac for the proof. I have said that I opposed the theory and not the man—*no not the man.*

My first introduction to Dr. Hill, was at the time and on the occasion of his frightful visitation by the *infernal* committee, of which I had the honor to be chairman (this name is given to the said committee by the Dr. himself, and is not assumed by the writer). I beheld the man with great wonder, and swallowed every inch of him in no time. I then gazed with wonder at his tall and stately figure, his lofty brow, his piercing and intellectual *eye*, which rendered the occasion *emphatically infernal.* In the Dr., there is much suggestive of greatness of intellect and supernatural genius, likewise something that bespeaks him *truthful* and sincere in every capacity of life. When I first saw the Dr. I was overwhelmed with surprise *to see a man.* At first I imagined myself Diogenese with his dark lantern wandering from his tomb to see an honest man (Washington); next I thought of the chivalric sons of Adam, and sighed for one look at the immortal Brooks. The first in war, in peace, literature, science and in art, in heaven, on earth, and in hell, were brought to my mind by this most wonderful helion Raphael or Westkill Sancopansa. The Drs. figure is most prominent in my ideal cabinet, or collection of great men. The cabinet referred to is equal in capacity to Alladin's palace, and was built by the same magic art, and under the influence of the identical same lamp. In my collection of great men, the Dr. is first in rank, next stands Barnum, a full length statue on the same side of the hall, back for back in the groundwork. I have also full length statues of Sinbad the Sailor, Guliver, Robinson Crusoe, and other notoriously great men of whom I have not time to speak, with the exception of the Western man, who is photographing natural colors, and who on being asked by a lady to explain whence the colors came from, he replied that they came from her dress, and a few sittings would extract the color all out of it. He is a trump and will soon win a place in my cabinet.

Every nation has its great men; England her Johnsons and Goldsmiths, France her Napoleon, *America* her Hills, Paynes, and Barnums. But her morning star and propeller to American science is Dr. Hill; his name is forever immortal and America honored by it. Who does not envy the Messrs. Morse, Gurney, Whipple and others, besides members of the U. S. Senate. The periodical circulation of these names neatly printed on extra fine, with a fly-leaf and enclosed between two bright yellow covers, claimed by the Dr. as his *confidential* good *judges* of pictures, &c., &c. Is it not pleasant thus to dwell in the very bosom of *the* immortal, the great prince of American science.

My friend, a few lines more will bring me to a final close of this matter. After a humble acknowledgment of the corn and full confession of all the wrongs that I have done the Dr, I shall expect free pardon in large quantities. The Dr's. preponderous theory of photographing colors being consummated, and transferred to the second party for universal distribution among the sons and *daughters* of Daguere, for which I understand the Dr. has already received over $10,000 (so said the present owners of Hillotyping to a friend of mine the other day, but they would not allow him to see the pictures). In conclusion, I wish to congratulate the Dr. in his final success; also my best wishes for the present owners of *the star of Bethlehem, the new-born child of light, the glory of art, the prince of the world.* And last of all, though not least, those who will be so kind as to forward orders for the Hillotype process, inclosing XX and a V, will doubtless have a fine time, and may expect the prayers of the faithful,

Over the Left.

From the Jour. of the Phot. Soc.

LONDON PHOTOGRAPHIC SOCIETY.

Ordinary Meeting, June 5, 1856.

Sir W. J. Newton, V. P., in the Chair.

The Minutes of the last Meeting were read and confirmed.

Prof. Stokes, B. Clayton, W. Grundy, E. A. Gruning, and J. Buchanan Smith, Esqrs., were balloted for and elected Members.

The Chairman announced that the Council had nominated the Right Hon. the Earl of Craven, the Right Hon. Sir Geo. Clerk, Bart., Sir Thos. Maryon Wilson, Bart., Prof. Bell, F.R.S., and Wm. Crookes, Esq., as Members of the Council in the room of P. H. De la Motte, R. Fenton, T. F. Hardwich, W. Lake Price, and C. Vignoles, Esqs., resigned.

In consequence of a discussion as to the applicability of the 7th law of the Society (relating to the election of Officers) to a case like the present, it was resolved, on the motion of Mr. Matthew Marshall, seconded by Mr. Rippingham, that a Special Meeting be held on Thursday, July 3rd, at half-past seven o'clock, to consider the propriety of altering Law VII., and to take such measures with respect to filling up the vacant seats in the Council as may then be deemed advisable.

In the mean time, the above names were ordered to be suspended in the Meeting Room of the Society.

The Secretary announced that he had, by desire of the Council, been in correspondence with the Secretary of the Royal Academy on the Subject of the Amendment of the Law of Copyright, in order to procure its extension to the protection of photographic productions as well as other works of art; and that he had received a letter stating that Mr. Chambers, member for Hertford, was about to apply to the House of Commons for a Committee of Inquiry, and would include the photographic

pictures among the works of art which ought to be, but were not, protected by law from piracy.

The Secretary also announced that, during the sitting of the British Association, a Photographic Exhibition would be held at Cheltenham, to which the Members of the Society were earnestly invited to contribute.

Mr. Paul Pretsgh, late Manager of the Imperial Printing Office at Vienna, communicated a paper "On Photo-galvanography."

Mr. Pertsch's paper was illustrated by numerous engravings taken by his invention, all of which he presented to the Society. On the motion of the Chairman, a unanimous vote of thanks was given to Mr. Pretsch for his present.

Mr. Robert F. Barnes exhibited negatives, with positive prints from them, taken by his dry collodion process.

PHOTOGALVANOGRAPHY; OR, ENGRAVING BY LIGHT AND ELECTRICITY.

By Mr. Paul Pretsch,

Late Manager of the Imperial and Government Printing Office, Vienna.

In coming before this Society, I feel it necessary to explain why I come so late. The reason is simple. I felt that eyes accustomed to look at such perfect productions as most of your photographic pictures are, might judge too severely the first specimens of my process. I am aware that some of the specimens which I have now the honor to submit are not quite perfect. Still I trust there is evidence of progress in all, perhaps a near approach to perfection in some of the productions of the new art of Photogalvanography which is now introduced to your notice.

I presume that nearly every one in this distinguished Society has been anxious to render his productions durable, and to multiply them if possible by printer's ink. It is not necessary that I should mention here the various processes of my predecessors having a similar object in view. They are no doubt well known to most of you, and I have also mentioned them on a late occasion at the Society of Arts*.

During many years engaged in photography, I have been obliged to try several sorts of coatings for glass plates to be used in the art. Albumen, caseine, starch, glue, &c. have been used;—the appearance of some of the negatives obtained thereon originated the idea of the probability of producing, photographically, a picture in relivo and intaglio parts, instead of a mere picture made up of lights and shades. This led to the abandoning of etching or biting in with acid, and the substitution of a photographic coating adapted for finally obtaining a solid metal plate to print from.

After many trials, I adhered to the use of glutinous or gelatinous substances, and found in these materials, mixed with photogenic chemicals, and exposed to the influence of light and atmosphere, very valuable properties. These are to *swell* in water and moisture,—*to contract or shrink* in alcohol.—*to become firm* in more or less degree by the use of astringents, or by drying varnish,—*to become sunk* by the use of warmth,—*to be enlarged or magnified* by using acidulous solutions. Such properties are of great importance, and open an immense field for further investigations.

I think that my method may be applied in future with great success to the three known printing methods, although it is yet chiefly applied to but one of them. Permit me therefore here to explain briefly how photography can be applied to these three printing methods.

You are well acquainted with surface printing; types and woodcuts are the representatives of the same, and the printers' ink, used in this case, is light enough to adhere only on the surface. The case is quite contrary in printing from intaglio plates; the picture or engraving is sunk, and the heavy ink is rubbed in the sunk parts, while the surface of the plate is carefully cleaned.

Lithography, or rather chemical printing, differs entirely from the two mentioned before. I call it chemical printing, because the printing surface is chemically prepared in such a manner that only the fatty parts of the picture take ink, but the other parts of the surface refuse the attachment of the ink. This mode of printing is generally applied on stone, but zinc, copper, and even an artificial material can be used for the same purpose. The drawing can be done with ink on paper, and transferred on the plate; or it can be done immediately on the plate with a fatty substance by means of a pen or brush, or with a peculiar kind of chalk, or with a point of steel or diamond; but the plate always requires to be chemically prepared in such a manner that only the picture itself attracts the ink. This is Senefelder's invention.

Now permit me to call your attention again to the various peculiar properties of glue and gelatine, mixed with chemical ingredients, and rendered by the influence of light more or less hard and soft. These substances can be made raised and sunk,—can be kept soft or made firm,—can shrink, swell, and become enlarged or magnified:—certainly properties valuable enough to attract our full attention, and these properties form the principal of my method.

Returning to the object in view, I place before you a common photographic positive picture. This picture has been placed upon this glass plate covered with the before-mentioned mixture; they have been exposed in the usual way in an ordinary copying frame to the influence of the light; the picture on the plate has been developed or treated; has been kept raised, and then moulded. This mould has been made conducting, put in the electrotype apparatus, and a deposit of copper made thereon; this deposit forms the matrix. The same matrix has been placed again in the electrotype apparatus, for the purpose of obtaining finally the printing plate in intaglio. I have the honor to lay before you this printing plate, and also a print therefrom, which you may kindly compare with the original photograph. You see therefore here the various productions which must be obtained for the ultimate aim, the printing plate. At the same time, you will observe, Gentlemen, that the result is in the wrong position, that is to say, it is reversed. This can be obviated by using a reversed positive on glass or paper, or by using a strong positive on thin transparent paper, and placing the same in the wrong way, that is to say, the back of it on the coated plate.

Some of the specimens before you are done in the one, and some in the other way.

Permit me now, for the sake of clearness, to repeat here the different ways of producing an intaglio plate, viz.—

1. An ordinary positive on glass or paper.
2. The raised picture on the coated glass plate, reversed.
3. The mould, sunk—right position.
4. The first copper plate, the matrix, raised,—reversed.
5. The second plate or printing plate, right.
6. The print, reversed.

Or another way, in which, for instance, the small cathedral door of St. Laurant's is produced, viz.—

1. The positive original on paper.
2. The coated glass plate with the raised picture thereon, reversed.
3. The copper plate, deposited in the electrotype apparatus immediately upon the coated glass plate,—It shows therefore the picture intaglio, and right.
4. The print from it, reversed.

If the original is reversed, or if the original is used in the wrong way, the face upwards in the copying frame, the result is in both cases that the print appears in the right position, as you see in several instances.

Allow me to mention here another mode of producing an intaglio plate, which mode I have not sufficiently exercised, and therefore I can only show you an inferior proof of it. Nevertheless it is sure enough, and promises great advantage, viz.—

1. A positive original on glass or paper.
2. The coated glass plate with the picture thereon, sunk, caused by the use of a gentle warmth; the picture reversed.
3. The mould, raised—right position.
4. The copper plate, sunk—reversed.
5. The print therefrom,—right position.

Having described three methods for the purpose of obtaining

* See the Journal of the Society of Arts, April 25th, 1855.

intaglio printing plates, and having shown you specimens of each of them, I now proceed to surface printing. I must confess that I have been unable to execute something good enough to be placed before this meeting, but the future may doubtless prove the applicability of the method for this purpose. For the sake of explanation I proceed as before, viz.—

1. Original woodcut, or drawing for woodcut, or in some cases a positive photograph on glass or paper.

2. The coated glass plate with the raised picture, reversed.

3. The mould, sunk,—right position. The picture appears intaglio: we can now build up all the raised (white) parts of the picture by a wax mixture, make the whole plate conducting, and place it in the electrotype apparatus; the result is,—

4. A raised copper plate, reversed; and finally,—

5. The print by the common letter press in right position.

Or, after having obtained the mould No. 3, we place the same in the electrotype apparatus, and obtain a raised copper plate, the back of the same covered with fusible metal; it ought to be fixed on a block, and all the white parts cut out by the engraver. The result is a block for the letter press for obtaining the print in the right position.

Or, after having obtained a raised copper plate, without building up the matrix No. 3, I place this raised copper plate in the electrotype apparatus, and obtain an intaglio plate, which ought to be built up, as mentioned before, for the purpose of obtaining by electro-deposit the raised block.

Or, after having obtained the coated glass plate No. 2 with the raised picture thereon, I make the coating firm by astringents and drying varnish, and send it to the stereotyper. He makes his mould from it in the usual way by plaster of paris, and obtains a plate of type metal, upon which the white parts of the picture must be cut out by the engraver for finally obtaining the block to print from.

It is to be understood, that all the plates for surface printing ought to be treated strongly, for the purpose of getting as raised a picture as possible. By doing so, I lose some of the fine details, which circumstance is easily enough explained. For very fine results intaglio printing remains the best.

I come now to the application of my method to chemical printing on stone or zinc. It is well known to every practical man that a print from a copper plate, especially if the same is done by a peculiar ink suitable for this purpose, can be transferred to stone or zinc. The print in this case appears in the same position as the print from the copper plate. Is the print reversed, the print from the transfer is also reversed, and *vice versa.* Therefore, should we want to bring a reversed print from a copper plate to the right position, we are obliged to transfer this print first to prepared paper, and then from this paper to stone or zinc. In this process the last transfer is apt to lose some details, especially in the middle tints. I cannot therefore particularly recommend this method; I have only mentioned it because it may be applied usefully in some cases.

But a great advantage is offered by the chemical printing on stone or zinc, if we can cause the print to be transferred immediately from the coated glass plate with the picture thereon in sunk or raised parts. In doing so we save the process of making a mould, and electrotype matrix, and the electrotype printing plate; and we gain therefore a great deal of time, about a week, or in some cases a fortnight, which is a matter of great consideration. We lose here the important advantage of having a solid printing plate of copper, which can be altered, cut, multiplied; nevertheless this method in cases of expedition is valuble enough to try.

The desired result can be obtained in two ways. The first mode is to make an intaglio picture on the coated glass plate, and to supply it with ink like an engraved plate; the second mode is to prepare the coated glass plate with the raised picture upon it like a lithographed stone or zinc plate, in such a manner that only the drawing itself attracts the ink, and not the white parts. In both cases the impression from the glass plates must be done in a peculiar way, for the purpose of preventing the breaking of the glass. But the impression being obtained, and we want for this purpose only one impression, it can be transferred to stone or zinc by a clever manipulator with ease and certainty.

Instead of glass, we may apply in future perhaps metal, or any suitable material for this purpose.

It was my design in the first paper which I had the honor to read before the Society of Arts, to explain my method, and to mention the most valuable investigations of my predecessors; the present paper is intended to complete these explanations, and develope my intentions, to connect photography with the printing arts, and to make the printing arts tributary to photography. It requires a full knowledge of photography, a practical experience of the peculiar materials used in this method; and a perfect acquaintance with all the printing arts and the electrotype. The carrying out of this method is therefore the aim of an establishment; it depends upon the combinations of several processes, and it is not within the reach of a single man. The Royal Letters Patent, however, had been taken out for the purpose of covering the expenses of such an important concern, and we shall be very proud of being entrusted with any works for the members of this valuble Society.

My attention has been called lately to a claim made by M. Poitevin, and Messrs. Roussean and Musson in Paris, whose process appears to be similar, or rather identical with my own. My first English patent bears the the date of November 9th, 1854, and my first French patent the date of June 1st, 1855, while M. Poitevin has taken out a patent in France in August 1855, and the others I think have no patent at all. The priority of dates of my patents, therefore, evidence sufficiently the fact that I have been engaged in carring out my method a long time before the above gentlemen, and the number of the specimens before you may prove that I have been actively employed in perfecting the invention.

The applications of my method are doubtless very extensive. I think it can be applied wherever photography is useful, and that is certainly extensive enough, and it does not need to explain this to a Meeting like the present. Moreover, it can be used in conjunction with the assistance of a creating or finishing artist, who may give the desired effect, or animate the picture with the creations of his mind. This can be done on the original positive, or upon the copper plate, although the first way may be preferable. Paintings and originals of old modern masters may be reproduced touch for touch, and the artist can be furnished with a printing plate of his own drawing without the aid of an engraver.

I have had little opportunity, and have been too much engaged with the applications described, to test sufficiently the use of this method for calico-printing, and for the production of plates for the wants of potteries. Permit me, however, to direct your attention to the imitation of niello plates for the ornamentation of manufactured articles. The production of niello plates originated the invention of copper plate printing, and the present method may be able to execute niello plates of a beauty and fineness never thought of.

In explaining to this Meeting the different modes by which the wonderful art of photography may be brought into connexion with the printing arts, and with some other branches of industry, I have endeavored, I think, to open an immense and exceedingly useful application of the same. Photography may be used in future chiefly for taking negatives, and the pictures taken by photography may be used with greater advantage, and may become more renumerative and more obtainable by the million than heretofore. I hope and wish that the members of this Society may assist me in carrying out his aim, almost too heavy a load for my shoulders. Knowing the importance of this idea, I came to England, trusting that this was the place where the spirit of enterprise was animated enough to furnish the necessary means and the desired amount of ingenuity for establishing such a difficult but promising business. Judging by my present experience, I think I am not mistaken, and even the present evening may advance my wishes. I offer my cordial and heartfelt thanks for the attentions of many distinguished gentlemen connected with photography, and for the kindness with which you have accepted the efforts of a man who seems to

be almost a stranger to you, but who has for many years watched and worked in sympathy with this Society and with this country.

The Chairman.—It appears to me a very useful extension of the Art of Photography, and I beg to propose the thanks of the Society to the author of this very interesting paper.

Mr. Shadbolt.—There are one or two inquiries I should like to make. In the first place, I see here two proofs evidently from the same metal; one is decidedly better than the other, but to my astonishment, the best is that which shows the inscription upon the building reversed. I certainly considered (it appears erroneously) at the first glance, that the specimen I hold in my right hand had been reversed, or rather put right again, by one additional process. I shall be glad if Herr Pretsch will give me some explanation how it is that the proof which *has* undergone the additional process appears to be a better one than the other.

A suggestion crossed my mind that I think may be made available to remove a little difficulty. The easiest way, If I understood the paper correctly, to print so that the final result is reversed as regards the original. The positive picture, from the first negative, is made use of to cause the impression upon the gelatinized plate. It appears to me that it would be better to make use of the process brought before this Society by Mr. Archer, that of covering the collodionized plate with film of gutta percha; and if the film of collodion be removed from the plate by that process, then the *film* of *collodion* itself can be brought into absolute contact with the paper to produce a positive in a reversed position, and this positive with the gelatinized surface; and consequently you lose nothing by one transfer, and you at the same time get a final result correct as regards the original.

Herr Pretsch spoke also of a mould being used. I missed that part of the paper as to what the mould is made of; I presume it to be wax.

Herr Pretsch.—Of gutta percha.

Mr. Shadbolt.—Do I understand, then, that the gutta percha is pressed into the gelatine?

Herr Pretsch.—It is a peculiar process between pressure and casting.

Mr. Shadbolt.—I shall be obliged by a little information as to how the one that is correct is rather sharper than the one that is reversed, as regards the original.

Herr Pretsch.—In the one case the paper positive was laid face downwards on the gelatinous coating, but to produce this, which you think the best, the original was on thin paper, and was placed face upwards, the back of the print being in contact with the gelatine. It is not always that we can do so; but if the picture is strong, and the paper thin and transparent, it will succeed. If the picture be prepared expressly for this purpose, it is advisable to do it on thin paper, sometimes you require wax, but not always. Mr Archer's process has great advantage over this method. We are in communication with him, and have tried several pictures. It is rather troublesome to take them off, and especially the large pitures, but still the difficulty may be overcome.

Mr. Hardwhich.—I had hoped that Herr Pretsch would have given us some information as to the mode in which the gelatinous film is prepared. He has stated to me, that if the gelatine plates are exposed to the light for a brief space of time only, and then treated with water, you have the reverse of the usual actiou; the parts on which the light has acted swelling up, and the others remaining depressed. It occured to me that the presence of iodide of silver might have something to do with this alternating action of the light. I should like to inquire of Herr Pretsch whether the same result would arise if the iodide of silver were omitted. It does not appear theoretically what is gained by employing iodide of silver. Has it anything to do with the granulated appearance of the impression after treatment with water?

Herr Pretsch.—If the time of exposure be short, we get a reverse result on placing the gelatine film in water, but not so decided as the usual one. We have tried to avail ourselves of this fact in simplyfing our present process, but at present have not perfectly succeeded in doing so. We use silver solutions and iodide of patassium, or ammoninm, because we find that with bichromate of potash only the granulation is not so perfect. That is all I have to say on the subject; but I have here a written paper on the production of my pictures from negative instead of positive proofs, which perhaps the Secretary will kindly read to you.

The Secretary read as follows:—

Taking positive pictures immediately by the camera has been tried in several ways many years ago. The modes of doing so are very interesting for the science of photography, but they have been as yet of very little practical result.

If we prepare a paper with chloride of silver in the ordiuary way, and expose it to the influence of light, it becomes black. Now we may brush the paper with a solution of iodide of potassium (or with a similar hydroiodic salt), and expose it in the camera to the influence of light, but allow a longer time of exposure than usual. The result is a positive picture, because the use of iodide of potassium in connexion with light produces a bleaching effect in this instance.

Another mode of obtaining a similar result is, to take a negative picture on paper in the ordinary way. Having exposed it a little longer than usual, it is developed strongly with gallic acid, and placed still moist in the light. It vanishes, and appears again as a positive picture.

Herschel publish many years ago valuble investigations into various modes of obtaining positive pictures by juxtaposition immediately from the original as also did Fisher in his 'Photogenic Manipulatious.' But Mr. Robert Hunt, I think, made the most important trials in this branch, and it is a pity that his directions have not been more cultivated.

But all these modes of obtaining directly positive pictures, either in the camera or by juxtaposition with the original in the copying frame, give no clue for the application of the same to this method. I have made several trials in using a negative picture as original iustead of a positive one, but I must confess That I have been unable to succeed so perfecty as I could wish. Here are two specimens of such a trial. The original was a negative on glass, placed upon my coated glass plate, a mould from which was made, and the mould placed in the electrotype apparatus. Two copper plates have been done by electro-deposite, one the matrix, and the other or second plate, which we use generally as the printing plate. You see here two impression; one impression from the first, and the other from the second plate.

Time of exposure is in this process exceedingly important. But even if we find out the exact time, the result is very doubtful. The dark parts of the picture may have the strongest granulation, but in a negative picture these parts are very transparent, and therefore the light can act upon them, and make the coating beneath less sensitive to the influence of moisture. In using a positive, the light acts upon the unprotected parts of the coated glass plate, and renders these parts (the white parts of the picture) more firm and less sensitive to the influence of water, while the other parts, viz. the picture, becomes brilliantly raised.

Mr. Shadbolt.—If I understand Herr Pretsch correctly, he states that the granular appearance is due partly to the iodide of silver with which he impregnates the film.

Herr Pretsch.—I rather think it is due to the chromate of silver.

Mr. Malone.—Before we leave this part of the subject allow me to mention some chemical facts which seem to bear upon the scientific principles involved in this new process. I allude to some experiments I have recently witnessed made by a skilful chemist, Dr. Muller. He has shown that an oxide of the metal chromium is capable of acting upon gelatinous materials in a somewhat similar manner to that in which tanic acid is known to act in the ordinary process of tanning, that is to say, a solution of chronium converts skin or other gelatinous materials into a species of leather; the oxide of chromium replacing the tannic acid of the oak bark commonly employed; the gelatine, at first soluble, when

combined with chromium, becoming insoluble. The experiment is made by taking a neutral solution of gelatine, when a precipitate is obtained consisting of an oxide of chromium combined with certain elements of the gelatine. The precipitate is insolble in water.

Now it appears to me that in the photo-galvanographic process the well-known deoxidizing action of light comes into play, the chromic acid of the bichromate of potash loses oxygen, sesquioxide of chromium being formed, which, uniting with the gelatine, renders it insoluble on subsequent treatment with water. This will account for that portion of the plate which has been longest exposed to the sun, which represents the lights of the picture, not being afterwards swelled by means of water, as the parts in shade are distinctly seen to be.

The Chairman.—As the subject of gelatine has been discussed, I do not know whether any gentleman would like to try my process; I have requested Mr. Williams of Cavendish Square to prepare some of the gelatine mixture of which I made use. It is admirably well done, and requires a great deal of care to make it properly. It is excellent for going over the picture afterwards and for fixing, and it is sure to keep.

Mr. Fenton.—In answer to some remarks that have been made, I may mention that that point has already come under the attention of those who are working on this process. It is an important process in the art of photography. We have suspected for some time that bichromate of potash was not the only element, and it was found to be only one of the elements. In carefully making experiments, we have been led to believe that bichromate of potash is not actually needed. It is certainly chromic acid and the materials combined with it which leads to this hardenig effect on the gelatine. I may state that we have carried our experiments, so far that a preliminary application for a patent for carrying out the process in that way has been made, believing that to be the real principle upon which it is founded.

Mr. Malone.—May I ask whether a patent has been already taken out?

Mr. Fenton.—I believe so. I believe the application has been made for a patent for the production of these results by chromic acid.

The Chairman announced that Herr Pretch desired to present the Society with the pictures exhibited by him.

A vote of thanks to Herr Pretsch for his donation was proposed and uuanimonsly agreed to.

NORWICH PHOTOGRAPHIC SOCIETY.

The usual Monthly Meeting of this Society was held in the Council Chamber on the 6th inst., and was numerously attended. The President, T. D. Eaton, Esq., in the Chair. After the election of a new member, an alteration in one of the rules of the Society was proposed by Mr. Bridgeman, the effect of which was to give the Society the power of electing more than one Vice-President if thought expedient. This proposition was carried and concluded the ordinary business of the meeting.

The Annual General Meeting of the Society was then held, the President in the Chair.

The following report or address of the Committee was then read by the Secretary:—

This Society enters the third year of its existence under new auspices. Being publicly recognized by the London and Liverpool Societies, which have honored it with their notice, it may be said to work like bees under a glass hive.

"This may be either for good or ill. If it stimulate the members to enterprise by exciting a spirit of generous emulation, much profit may come of it; but if it make them fear to bestir themselves, lest their falings should become patent to others, they had better have remained in their old obscurity.

"There is, however, no solid ground for discourage. Pictures and models have been exhibited, and papers read in this room, which would not have discredited any Society in England. But they have been comparatively few, because those who either could not, thought they could not produce equal results have done nothing. Now this is not modesty but pride. We will not do our best, lest others should do better. But every member should be ready to throw his mite into the common treasury. Some may quarrel with you for reading bad papers or showing bad pictures, as Claudius scolded the heavens when it thundered, without reason; but all will complain, and justly, of those who do nothing at all. If a perfect picture be more beautiful, a faulty one is more instructive. So again of papers—he who advances what is new, may advance what is false, but some latent truth may be detected by means of the falsehood which might otherwise have lain dormant. The great difficulty, however, has always been to get up anything like discussion. But the most valuable hints would probably drop out in a debate. The value of things which the utterer would not have *written* because he attached no value to them, may be caught, appreciated, and exposed by one or other *hearer* to the benefit of all. If discussion did nothing else, it would at least dispel that oppressive incubus of silence which sometimes throws a needless gloom over our meeting.

"With regard to the channels into which the labors of photographers may be sluiced off and run, it is needless to refer to them, because they are sufficiently indicated in every number of the London Photographic Journal. Like the Athieans of old, we are too fond of being diverted by every new thing. But there is one branch of the art to which too much attention can never be paid, and that is the safe fixation of positives. Mr. Sutton's pictures have lately been severely tested by Sir David Brewster, and have come unschathed out of the trial. The former is said to have jnst put forth a new hypothesis of positive printing, and the success of the result entitles his opinions to grave consideration.

"Photography and Photographic Societies are everywhere flourishing and augmenting, and therefore it would be hard indeed if this Society could not keep its grouud. It has the main negative element of success, freedom from debt. Its funds are adequate to its wants, and its members have sufficient skill in their art to justify an ardent love for and earnest pursuit of it.

"Whether we shall next year have the stimulus of an exhibition it is as yet impossible to say. It is however gratifying to find that photographic exhibitions succeed in other places, and that one has lately beeu opened in Manchester, containing more than 600 pictures.

"A new field is open to those who delight in experiments by Mr. Lyte's plan of substituting phosphate of soda for the salts usually employ to prepare papers for the sensitive solution, and fixing with a weak nitric acid iustead of hyposulphite of soda. This method does not seem to have been carried to perfection, but it offers some peculiar advantages. The use of glycerine in the preparation of collodion plates, promises well since Messrs. Price have afforded to the public pure glycerine as an article of commerce. It may hereafter be successfuly applied to paper.

"The formation of a new Society, based upon commercial principals, bearing the title of the 'Photographic Association,' and registered under the Limited Liability Act, proves how deeply the art is striking root in this country, and how rapidly it is throwing out its branches. The London Photographic Society views this new brotherhood with pardonable jealousy, considering how much mischief has been done by patents, which those who make pecuniary gain their object have naturally been eager to secure. But the time for dreading much injury to photography from patents has now gone by. Neither has it any longer much to fear from a sectarian animosity. Its principles and uses have obtained such a world-wide recognition, that any attempt to stifle or corrupt them would be tanamount to endeavoring to 'poison the sea.'

"In conclusion, the accounts of the Norwich Photographic Society show a considerable balance in hand, and the number of members has during the past year steadily increased, notwithstanding that several names have been withdrawn in consequence of members ceasing to reside in Norwhich."

The following were then elected officers of the Society for the ensuing year:—

President:—T. D. Eaton, Esq.

Vice-Presidents:—W. B. Francis, Esq. ; Wm. H. Ranking,

Committee:—J. Howes, Esq. ; J. Stewart, Esq. ; H. Geldart, Esq. ; T. Loud, Esq.

Hon. Secretaries:—H. Harrad, Esq., E. S. A. ; N. Pully, Esq.

Mr. W. D. Parr then read a paper on the use of acetate of soda as an accelerator.

Mr. Blowers exhibited a slide, by which he was enabled to take a large number of pictures on paper without removing the slide. He also mentioned having on an emergency used common vinegar instead of acetic acid for collodion plates with perfect success.

Several excellent photographs were exhibited by Dr. Ranking, Mr. Stewart, and Mr. Blowers.

ON COLLODION.

BY PROF. VON BABO.

[From Poggendorff's *Annalen der Chemie und Physik*, vol. xcvii. p. 499].

Although the excellent pictures which are produced by skilful photographers sufficiently prove considerable advance in the *practice* of photography, yet the great uncertainty of success in the production of negatives, which is constantly experienced by less practised operators, seems to indicate that the *theory* of the different processes is anything but established. The very fact, that a great variety of very different formulæ is recommended, all of which sometimes produce good, sometimes bad pictures, shows the insufficiency of the theory.

In order to find the cause of these numerous discrepancies, Prof. von Babo went through a variety of experiments, which led him to the following results:—

1. One chief condition of success is absolute neutrality of the preparations which are used for producing the sensitive surface of iodide of silver. This condition is not so easily arrived at as one might suppose. If the collodion contains the smallest possible trace of free acid, it will decompose the iodides when brought in contact with them, hydriodic acid and iodine being formed, which impair the sensitiveness of the film.

For the purpose of taking away the free iodine, it is usual to add silver in a state of fine division. This however does not always answer the purpose, and never for any length of time. Metallic silver, in the presence of iodine or iodide of potassium, decomposes the collodion. A white precipitate is formed, which consists of organic matter and iodide of silver; the collodion gets limpid and useless.

But even if the metallic silver is removed as soon as the collodion has become neutral (*i. e.* decolorized), it will soon get colored again under the influence of the atmosphere, and will lose its sensitiveness. If an alkali is used to remove the free acid, it easily happens that the point of absolute neutrality is overstepped and an equally useless preparation obtained.

All iodides act more or less on the collodion, however neutral it may appear to be; but the different iodides show this effect in different degrees; the facility with which the decomposition takes place is, moreover, influenced by the relative proportions of water, alcohol, and ether in the collodion. The richer a collodion is in ether and absolute alcohol, the more constant, *cæteris paribus*, it will be; but it will become less useful, for other reasons to be mentioned hereafter.

Among all the iodides which Prof. von Babo experimented upon, the iodide of tetrethylammonium proved to be the most constant, probably because the free iodine would not produce iodic acid, but the body described by Weltzein as teriodide of tetrethylammonium, which does not so easily undergo further decomposition.

Collodion prepared with iodide of ammonium will also become more permanent if, before the addition of the whole quantity of iodide, the collodion is duly diluted with ether and alcohol, then a *little* iodide added, and the whole, with the addition of a little pure urea, boiled for some time in an apparatus which allows the evaporating ether to flow back. The urea combines with the free nitric acid, and decomposes any nitrous acid that may have been formed. The collodion will have acquired a slight yellow color; when cold, it is shaken with a little silver till the color disappears, then poured off or filtered (in a funnel adapted to the filtration of ethereal compounds). If now the necessary quantity of neutral iodide of potassium or ammonium is added, a very sensitive preparation is obtained, which gives sufficiently powerful pictures even in a weak light. An excess of urea does no harm.

2. Of equal importance with perfect neutrality is the absence of any reducing substance in the collodion. If aldehyde, sulphurous acid, sulphuretted hydrogen, alloxantin, protoxide of iron, pyrogallic or formic acid, are added, the action of the light upon the plate is very much weakened, if not altogether stopped. This is one of the reasons why old collodion loses its sensitiveness, because aldehyde is formed under the influence of free iodine, as I have found by examining the products of distillation of such collodion. We also see from this, that for the preparation of highly sensitive collodion no alcohol or ether must be used but that which has been freshly distilled with caustic potash. It may also be of advantage to boil the gun-cotton with a solution of urea, in order to destroy the least trace of nitrous acid; but on this point no direct experiments have yet been made.

3. The collodion must be free of iodates. Their presence nearly destroys the action of a weak light. As free iodine by its action upon nitrate of silver causes the formation of iodic acid, this is a further reason for the want of sensitiveness in a collodion which contains free iodine.

4. If nitrate of silver is mixed in the dark with an excess of iodide of potassium, and then exposed to the light, pyrogallic acid produces no reduction, or at least not till after some time. If freshly precipitated iodide of silver is collected on a filter and washed in the dark, it is likewise not sensitive to light. But if so much iodide only is added to the nitrate of silver that a small excess of the latter remains, the pyrogallic acid will at once act after exposure to light. The same takes place if the pure iodide of silver is mixed with a little nitrate. If, on the other hand, so much nitrate is present as to dissolve a part of the iodide, a loss in sensitiveness will be experienced.

This is another cause of frequent failures when least expected, and explains why the most different preparations will produce sometimes a good, sometimes a bad result. The quantity of free nitrate of silver which is taken up by the film depends indeed on a variety of circumstances, which are not always in the operator's power. The strength of the nitrate bath and the quantity of iodide in the collodion have of course the most important influence on the result; but within certain limits that result will depend on *the endosmotic state of the collodion*.

The plate is put in the silver bath before all the ether is evaporated. The exchange going on between the substances in the collodion and the silver bath is therefore of a very complicated nature. Alcohol and ether are exchanged for water; oxide of silver is changed to iodide; nitrates of potash (or ammonia), ethylammonium, and urea are formed, and diffuse with the silver solution until a state of equilibrium is, not fully, but nearly established. It is therefore clear that according to the quantity of alcohol and ether on the plate (the relative proportions of which again depend on the temperature at which the collodion was poured on), and, according to the nature of the iodizing solution, sometimes more, sometimes less free nitrate of silver will be taken up by the plate, and that therefore within certain limits the success of the operator will depend on chance or experience. But even in this respect the Professor thinks that the use of urea, and particularly that of ethylammonium, offers greater chances of success than that of the potassium and ammonium salts, because a greater quantity of free nitrate is always retained in the film. The difference showed itself particularly in the following way. When iodide of potassium or ammonium was used, an increased intensity of the light very soon ceased to produce a corresponding intensity of the pic-

ture (on the contrary, after some time the depth of the tones in the negative began to *decrease*), while if iodide of tetrethylammonium was used, the result remained more proportionate to the intensity of the light. Lastly, as alcohol diffuses more powerfully with water than ether does, a considerable percentage of alcohol is in most cases favorable.

Without attaching too much weight to a particular formula (because, as was shown in the preceding, the proportions will always depend on circumstances), Prof. von Babo recommends the following collodion with a silver bath of 8 to 9 per cent. (30-gr. solution):—

Gun-cotton	1 part.
Alcohol of 80 per cent	30 to 40 parts.
Ether	50 to 60 parts.
Iodide of tetrethylammonium	0·5 to 1 part.

The iodide of tetrethylammonium is dissolved in as little spirits of wine (of 50 per cent.) as possible, heated for twenty-four hours with precipitated silver to take away all free iodine, and then added to the collodion. The plate is left for a few seconds in a horizontal position till the smell of ether is nearly gone before it is introduced into the silver bath. If touched with the finger, the film should present a gelatinous consistence.

A MANUAL OF PHOTOGRAPHIC CHEMISTRY; Including the Practice of the Collodion Process.

BY T. FREDERICK HARDWICH.

Late Demonstrator of Chemistry in King's College, London. 3rd edition. London: John Churchill, New Burlington Street, 1856.

It would be difficult to find a photographer who has not availed himself with advantage of Mr. Hardwich's researches, and who is not largely indebted to him for information derived from delicate and laborious experiment, but freely and lavishly given to the world.

It must therefore be as much a source of gratification to all followers of the Art as it is to the author, to find that a *third* edition of the above work has been called for within fourteen months from the date of its first publication; not only because it shows a due appreciation of the value of sound scientific instruction, but also the rapid advance of Photography in England. Mr. Hardwich, however, has not been content to rest upon his oars, and enjoy the credit and reputation which the "Manual" has already secured him, regardless of improvement or of the rapid onward course of the Art he has done so much to promote. In entering upon the task of revision, he has evidently carefully reflected in what way he could make his work even more complete and useful than before; the result has been a volume of great *practical* information combined with deep scientific research.

The present edition of the "Photographic Chemistry" is, in fact, altered and extended in every part, the aim of the author having manifestly been to collect the most recent information upon each topic, and to make it as concise and practical as possible; in particular to recommend those processes which the experience of many operators has proved to be successful.

An abstract of some of the additions, improvements, and original matter now first introduced will doubtless be acceptable and useful, and will demonstrate more fully the merit of the work than the most elaborate panegyric. In the first place, then, there are some remarks on the manufacture of collodion, which show that the writer considers this to be a subject requiring further examination; inasmuch as although with pure materials a good collodion can easily be made, yet all the substances which act as impurities not having been pointed out, it has been difficult commercially to obtain a uniform product. The writer believes that the *temperature* of the nitrosulphuric acid is a more important point than has hitherto been supposed, and he has found markings upon the film result from the employment of too hot an acid, which markings were removable by chloroform. Chloroform is a substance which will often be found useful in collodion, but at present it is uncertain in what way it acts. Inquiries are frequently made for a collodion fitted for hot climates. In such a case the amount of alcohol should be considerable, and iodide of cadmium, or a mixture of iodide of potassium and cadmium, would be the best for iodizing. It will be useful also to bear in mind the *expansion* which fluids like ether undergo at high temperatures, and to make proper allowance for it. The opinions given to the author by practical operators on the use of *Bromide* in collodion have been various, but they agree in representing that the sensitiveness of the fluid is a little diminished. Dr. Diamond and others who employ this salt, have obtained negatives with very fine half-tones, and it seems that the effect of the bromide in certain conditions of the film, is to lessen that excessive *contrast* between lights and shadows which prevents the proper development of the middle tints. Hence it should be employed in some cases, but not invariably, since with a pure and rather dilute collodion no difficulty will be experienced in getting half-tone.

No collodion will answer equally well for every purpose; sometimes a thick and sometimes a thin film should be used, according to the amount of half-tone required; and with any collodion the condition of the nitrate bath will have to be attended to. The presence or absence of nitric acid or acetate of silver are the principal points. The writer has collected information on this head from many of the most experienced operators, and he finds that those who work with their own collodion are decidedly favorable to acetate of silver in the negative nitrate bath; whereas those who purchase collodion, sometimes complain of too much intensity in the high lights of the image under such circumstances. Evidently the commercial samples of collodion are often purposely prepared with reference to intensity, and the writer warns those who makes experiments to remember this, as an explanation of occasional sources of discrepancy. As an example, he gives the case of the *glycerine preservative process*, which he has himself seen to produce excellent results, but was not able to repeat them successfully when working with his own collodion. In attempting to discover an agent which would give additional intensity to collodion, he has been met by the difficulty that organic bodies of the kind required mostly injure the sensitiveness and the power of rendering half-tone. Upon the subject of acetate of silver, as a means of increasing intensity, he remarks further, that in copying manuscripts or engravings it will be found very serviceable in assisting to give perfect opacity to the blacks; but that the glasses must be carefully cleaned in order to avoid spots and black marks from irregular reduction.

The most important alterations in the present edition of the "Photographic Chemistry" might be found, as might be anticipated, in the chapters on positive printing. They have been entirely re-written, in accordance with the views gathered from the author's researches. It will, however, be right to state, that no new principle is introduced. Many appear to have expected that the result of the investigations undertaken for the Society would be the discovery of a distinct process not liable to error; but the author is of opinion that much may be done with the existing processes, provided proper care be taken; and he has directed his efforts towards ascertaining the main causes of failure, that photographers may be enabled to print positives as permanent as those which have remained unaltered ever since the first origin of the Art. It was at one time believed that ammonio-nitrate prints were unstable; but his investigations have convinced him, that with the exception of a little advantage gained by the employment of albumen, all the ordinary processes are about upon a par, and that selection may be made from them indifferently. It is in the fixing and toning that so much care is required; and if this be improperly performed, the proof will fade on exposure to damp, whether printed by development or by the direct action of light.

In discussing the theory of the subject he divides it into the preparation of the sensitive paper, and the toning and washing of the proof. The operator should prepare the paper according to the tint he wishes to obtain, which will be better than work-

ing always with one kind of paper and trusting to the action of the hypo-bath for the desired color. He does not advise that the action of the fixing and toning bath should ever be pushed to its utmost limits, because experience proves that prints which have been toned to full blackness are the most liable to become yellow in the half-tones on keeping. An experienced photographic printer will also keep a stock of paper prepared with different proportions of salt, in order to bring out all the details of intense and feeble negatives; and if he understands the use of ammonio-nitrate of silver,—that preparation, facilitating as it does the action of light, will always enable him to throw a little additional intensity into the deep shadows when printing from a feeble negative. The writer has found a substitute for ammonio-nitrate of silver, which can be used with albuminized paper without dissolving off the animal matter. It is prepared by dropping nitric acid into the ammonio-nitrate, the result of which is, that the oxide of silver remains dissolved in nitrate of ammonia instead of ammonia itself. Albuminized paper brushed with this solution of oxide of silver is perhaps the most sensitive kind of paper which can be made, but there is a little trouble with it, arising from the difficulty of applying nitrate of silver to an albumen surface with a brush, and also from the fact that the smallest quantity of free ammonia in the liquid takes away the gloss.

Complaints are constantly made of the discrepancy between the formulæ of different photographers, but the writer thinks it will not be easy to reduce them to one uniform scale; so much depending upon the quality of the paper and the mode in which the solutions are applied. He distinguishes between close-grained English papers with a hard surface, and foreign papers, like Canson's positive, of porous and open structure; and shows the difference between the plans of brushing, floating, and immersion, all of which have been recommended for preparing paper: the same formula cannot however be applied to each, because by the latter plan a much larger quantity of liquid is left upon the surface of the sheet. The chemical composition of the size is another important point to be borne in mind, since animal matters of various kinds assist the reduction of the sensitive silver salts, and have a colorific effect upon the image. Hence an English paper will give a different result from a French paper, both being prepared by the same formula.

The proper strength of the fixing bath for positives has been discussed, and in determining the correct proportion of hyposulphite everything will depend upon whether or no the nitrate of silver is washed out of the sheets before fixing. It is theoretically incorrect to place a print loaded with free nitrate of silver in a dilute bath of hyposulphite; but if the plan recommended be followed, viz. to begin by washing with water—the strength of the hypo becomes immaterial, a weaker bath requiring only a longer time. The conditions of a proper fixing are—that the print, washed and dried, should appear clean when held up to the light; a spotted appearance, invisible upon the surface, indicating decomposed silver salt remaining in the tissue of the paper.

The chemistry of the hypo. fixing and toning solution is another subject which must be studied carefully, because it can be proved that the stability of the prints is much affected by the condition of this bath, and hence, as before said, it is in vain to adopt any particular printing process if proper care be not taken in the toning. There are conditions of the bath which are injurious to the proofs, and although every print so produced will not necessarily fade, it will be placed in a state less favorable to permanency. No acids of any kind ought to be added to the bath of hyposulphite; and as chloride of gold almost always contains free hydrochloric acid, the solution must not be used immediately after mixing. An addition of gold must be made from time to time, so as to produce colors which will stand boiling water; for it will be found practically that there is an immense difference in this respect, and that a rapid deposition of gold will give a picture which may be immersed in hot water with comparative safety.

After the print is washed, the size is to be removed, perfect security from hyposulphite left in the paper being obtainable in no other way; and experiments having shown the great difference between pictures with and without the size, as regards facility of oxidation. Boiling water will be preferred by some for taking the size out of the paper; but the common washing soda, always at hand, is equally efficacious; and if the process be properly performed, ink will *run* in attempting to write upon the back of the print.

The subject of the fading of positives which has lately excited so much attention is dwelt upon at length in this edition; the writer's experience having been derived from a careful examination of collections of old photographs, and from original experiments. The first Report of the Printing Committee appointed by the Society stated distinctly that *imperfect washing from hyposulphite of soda* appeared to have been the principal cause in the cases mentioned in the evidence; but in addition to this it is now known that the presence of bodies which favor *oxidation* will determine the destruction of the image, amongst which must be classed the products of the combustion of coal gas, vapor of chloride of lime, fumes of acid, &c.; and in all these cases it is certain that the more the print is *sulphuretted* in toning, the more readily it will yield, and that the action is likely to begin at corners, edges, and isolated points, gradually eating its way into the centre of the print, and converting the image into a yellow substance resembling a photograph faded by sulphur. Hence the importance of producing prints of the most stable kind, and of keeping them removed from all these injurious conditions.

In this edition of the "Photographic Chemistry" the writer also notices the various processes lately proposed for the preservation of collodion films in an excited state; and after trying each in its turn he is convinced that *honey* will be the most universally preferred. He thinks that it has a chemical action upon the small trace of nitrate of silver left upon the film, and tends to preserve the plate from fogging and irregular reduction. Also that it acts during the development of the image, furnishing an organic element of *intensity*—which with some collodions is much wanted,—and yielding a good quality of negative. Having experimented carefully to find how far the details of foliage and other dark objects can be brought out upon the preserved plates, he finds them quite equal in this respect to the fresh plates, and in some cases superior. The extreme sensitiveness of moist collodion is lost, but there is little fear of fogging from over-exposure, and a great freedom from solarization or reddening in the high lights, provided the proportion of free nitrate of silver be properly reduced. Glycerine will be likely to supersede honey eventually, as being more easily removed from the plate; but he believes that the collodion must be prepared purposely with some organic substance which shall obviate the tendency to fogging and increase the intensity.

Mr. Llewelyn's mode of manipulation is extremely simple and convenient, but with the collodion he employs, the writer has found the development of the image tedious and difficult; to obviate which he adopts the plan first advised by Mr. Shadbolt, and washes the plate with a highly dilute solution of nitrate of silver instead of plain water.

These constitute some part, but are by no means the whole, of the new stock of information added to the "Manual of Photographic Chemistry;" enough however has been given to prove that the favorable opinion expressed at the beginning of this notice is fully borne out by the work itself; and that any photographer in any stage, bungler or proficient, scientific or ignorant, will derive instruction and assistance from its pages. There is one more point of sterling excellence which must be noticed before quitting the subject, and that is the completeness of the index in the present edition; a most especial advantage in any work, but particularly so in one of a scientific character. There is not an important fact relating to any subject in photography which is not to be found mentioned, and this is an additional evidence of the completeness of the work itself. There can be no question that Mr. Hardwich has in many ways deserved (and it is hoped obtained) the sincere thanks of photo-

graphers for his numerous services to the science; but if he had contributed nothing more to its elucidation than this work he would have earned the warm and lasting gratitude of the scientific world.

From the Jour. of the Phot. Soc.

M. TAUPENOT'S PROCESS.

To the Editor of the Photographic Journal:

Bradford, May 17, 1856.

SIR,—As you expressed a wish in your last month's Number to know how Taupenot's process was progressing, I will venture to trouble you with a few words respecting my experiments in that direction. My attention was first drawn to the process by Horne and Thornthwaite's mention of it in their "Guide," and following the directions there given, I essayed to arrive at the same satisfactory results; with what success I will now inform you. My first picture was good and encouraged me to proceed; but as my albumen bath had become discolored from formation of sulphuret of silver, I introduced animal charcoal into it, and tried again; but this time I *failed completely*, the surface of all my plates after development being alike covered with stains, which in some completely, and in others partially obliterated any trace of an image, and in many subsequent trials the result was the same. This corresponds with what I have heard from others, who having tried, have met with the same stains, and after repeated attempts have given the process up in despair:—but to return; I remembered that my first picture was successful, and I therefore made a new albumen bath and tried again; as before, my picture was very fair: this was what I expected; but reflecting that it was only after the introduction of the animal charcoal that the stains made their appearance, I this time tried kaolin, and obtained decidedly better pictures, the stains being now only observable round the edges, the centre of the plate developing well and evenly. It immediately occurred to me that these marginal markings were owing to my washing the plates more in the centre than at the edges; so I prepared a fresh batch, and after washing them as usual, I allowed a stream of water from a tap to fall with considerable force on the edges only of the plates, my object being to remove anything detrimental, which might have lodged there, by the action of the water on the centre of the plate. The result of this experiment was perfectly satisfactory; and since that time, following the same plan, I have *never had a failure*, and I can with perfect certainty take out a dozen plates for a morning or afternoon's excursion and bring back eleven good pictures. It is possible that my animal charcoal may have been impure, and that had I procured another sample I might have got the same good results as with kaolin; this your readers may determine for themselves, I merely repeat the fact, that I succeeded with kaolin and could not with animal charcoal. I have heard numerous complaints about the trouble of preparing the plates by this method; and I confess that there is a little more trouble than usual, owing principally to the employment of two baths, and the absolute necessity which exists for the plates being perfectly dry before immersion in the second bath; but if others follow my plan of drying the plates in a *common oven* (care being taken to exclude dust), they will find them dry as fast as they are wanted for the other bath; it is to this method of drying very quickly that I attribute also the total absence of bubbles, which are frequent causes of annoyance, but which I have never even seen. The greatest objection I have heard urged against a dry process is the difficulty of adjusting the time of exposure; but this is of very little importance, as we must remember that a few seconds more or less makes no difference in an exposure of 3 or 4 minutes; moreover, with collodio-albumen the development can be regulated to suit the exposure. I have taken nothing as yet by this method except small stereoscopic pictures; and I may just remark, as a guide to those who wish to try, that with an ordinary quarter-plate lens and quarter-inch diaphragm, the exposure for a landscape in full sunshine at this time of the year, will be about $1\frac{1}{2}$ to 2 minutes; in the shade 3 to 4 minutes; this is much slower than wet collodion, but then your time is not wasted in preparing plates and making trials on the spot; all your work is done at home before you start, and you have nothing to do but take the views and develope them on your return, doing away at once with that dreadful incubus, "a dark tent," with all its attendant bottles and chemicals. I do not rail against collodion without having had any experience; I smothered myself under a tent on all my excursions last summer, and I never look at the pictures I took then without a shudder at the recollections they call up, if such a cold sensation can be felt whilst remembering the roasting undergone when taking them. Contrast this with the process I advocate, and say who will object to the little extra trouble involved; not to mention the superiority of definition. A photographer will at once appreciate the "comfort," if I may use the word, of such a process, and I know of nothing more delightful than to sit down at night after an excursion to develope your negatives, and watch the well-remembered details of each view as they gradually unfold themselves to the eye under the action of the reducing fluid; but I fear I am getting too enthusiastic, and in allowing my favorite hobby to run away with me, am in danger of encroaching too much on your space; I will therefore bring my letter to a close, merely stating that any further information I can give I shall be happy to supply, as I know from experience the many unforseen difficulties occurring in a new process.

I am, Sir, yours respectfully,

CHARLES F. BUTTERFIELD.

P. S.—I forgot to mention that I myself used iodide and bromide of cadmium for iodizing the albumen, but I have tried also the iodides of calcium and zinc with good results. Potassium gives minute holes in the blacks of the negatives; I sometimes notice these in a slight degree with cadmium, but not to any extent, so I still use it, as I think it gives, if anything, better half-tones. I enclose a positive stereoscope on glass, to enable you to judge of the minuteness of detail procurable; both negative and positive are taken by Taupenot's process. Albumen alone is better for the latter, but I have printed it by the same method as the negative, so that you may see the appearance they present.

From the Jour. of the Phot. Soc.

THE OXYMEL PROCESS.

When I published an account of the oxymel process, in the April Number of the Photographic Journal, I stated that I had been induced to offer my formula to the public, in an incomplete state, with a view of saving a season which was rapidly advancing. My experiments had then been only sufficiently perfected to convince me of the value of the process, a conviction which has been amply confirmed by my subsequent experience.

I regret, however, to find that I had miscalculated the sensibility of the film, as compared with that of collodion in its usual form.

A few hurried experiments which I had made for the purpose of testing this point, led me to believe that about double the ordinary camera exposure would prove sufficient; but I now find this is not the case.

Owing to the ever-varying degrees of actinic power in light, such experiments are oftentimes fallacious.

I am not even now certain as to the true comparative rate, but perhaps five or six times would be near the mark, and I should be much obliged if you will afford me space for this explanation; as my error may otherwise lead experimenters astray, particularly as it is always better to over-expose than under-exposed a photographic picture.

An ordinary landscape lens of 15-inch focal length, 3-inch diameter, and $\frac{1}{2}$-inch stop, will require an exposure, under favorable circumstances, of from five to ten minutes.

It is a remarkable fact, which I had not anticipated, that plates long kept require no greater exposure than those used at once.

I may also observe that the long washing recommended for the plate previous to its development does not seem to be re-

quired: it is only necessary to moisten the surface in order to ensure an equal and even application of the developing fluid.

It must be borne in mind also, that as all the free nitrate of silver has been removed from the film in the two water baths, a liberal supply must be added (about 2 drops of the nitrate bath to each drachm of the pyrogallic solution) before the picture will at all appear.

If this should fail in giving the required intensity, it is well to wash the plate thoroughly in water, and then proceed as before, with a fresh application of silver and developing fluid: this second treatment will often convert a feeble negative into an intense one.

With these observations, the simple formula which I published does not appear to me to require any alteration.

I have tested the keeping properties of the process on plates preserved for three weeks, and developed three days after exposure, without finding any appearance of deterioration.

The process in my hands is remarkable for the easiness of its manipulations, and the certainty and beauty of its results. The negatives which I have obtained by its aid are fully equal in brilliancy, in depth, in half-tones, and in all printing qualities, to the best which I possess.

I still confidently recommend it: the only drawback is its want of sensibility; but this I believe to be incidental to all preservative processes, and it should be remembered that the operator has his collodion materials in all their integrity at hand. No elements of danger are introduced into the nitrate bath, or into any of the chemicals used. If a rapid picture be required, it may be made in the usual manner, while a dip into the oxymel bath will convert it into one less sensitive indeed, but more rapid in its action than any other keeping process that I am acquainted with. In this state the excited plate may be preserved for a great length of time, and will yield photographs of the very best class. J. D. Llewelyn.

ON THE USE OF ACETATE OF SODA AS AN ACCELERATOR.

BY W. D. PARR.

In Mr. Hardwich's excellent 'Manual of Photographic Chemistry,' the properties of acetate of silver are explained, with its formation from the mutual decomposition of acetate of soda and nitrate of silver; and the addition of a minute portion of the nitrate bath for collodion negatives is advised, for the purpose of substituting acetic acid in the place of the nitric acid liberated when collodion is used containing any free iodine, acetic acid having a much less retarding effect than nitric acid during the exposure to light. After experimenting with the nitrate bath in the manner indicated in the 'Manual,' I was induced to think that a more extensive application of acetate of silver in negative processes than could be used through the medium of the silver bath (the salt being so sparingly soluble) might be attended with great advantage as an accelerator. Accordingly I applied a solution of acetate of soda to one-half of the piece of Canson's paper produced, after it had been iodized and sensitized in the usual way, but not washed. This paper was exposed in the camera for ten minutes—a $\frac{1}{4}$-inch diaphragm being used and developed with gallic acid. The result was that there was scarcely any impression on the side to which the acetate was not applied, whilst the other, equally clean, was sufficiently brought out. This method of using it, *i. e.* after sensitizing, is inconvenient. I therefore tried the effect of adding it to the iodizing bath, by which means any required quantity of the resulting acetate of silver may be introduced into the sensitive surface. I will now describe the process followed in taking the three negatives exhibited.

Immerse Canson's negative paper for three minutes in a bath of

Water	10 oz.
Iodide of potassium	75 grs.
Bromide of do.	25 grs.
Soda in crystals, previously neutralized with acetic acid	30 grs.

Free iodine sufficient to make of "sherry color," and hang up to dry. When required to sensitize two pieces for the dark slide, the glasses (of which there are four) are removed from the slide, two of them are levelled, and about two drachms of a solution of 38 grs. of silver and one dr. of glacial acetic acid to the oz. of water distributed uniformly over each. The iodized paper is now to be floated thereon for from three to four minutes, or till the dark purple tint of the paper is complely gone, when the superfluous nitrate is to be drained away and preserved for developing, and the margins of the glasses are to be blotted off. They are now to be placed in the slide, with a second glass on the back of each, then a thin card-board on each, with sufficient loose paper between to keep all in contact when closed. This process occupies about ten minutes, and the paper remains good and damp for five hours The time of exposure was from five minutes (in full sunshine) to thirteen minutes, according to light; a $\frac{1}{2}$ inch diaphragm and lens of 14 inches focal length being used. The image is developed by gallic acid, the drainings from the sensitizing process being added to the last if necessary. The remaining part of the process is the same as that usually adopted; but the waxing is made the last instead of the first operation, after the removal of all the size from the paper.

I had hoped to have made a favorable report of its application to collodion. The first trial with 4 grs. of the dried acetate of soda and 4 grains of the iodide of cadmium to the oz. of collodion gave a strong impression in about the ninth part of the time of ordinary collodion, and quite free from any symptoms of fogging. By the next day, however, the collodion had become so deteriorated, that universal decomposition took place on applying the developer (pyrog. acid), even when the plate had not been submitted to light. The ether is what I think must be injuriously affected by the presence of the acetate, as the iodized papers prepared with it improve, if anything, by keeping.

Having failed with collodion, I was desirous of trying the effect of a still larger dose in the paper-process. The small negative A, produced, is the result obtained by the addition of 7 grains of the neutralized soda to 1 ounce of the former bath, making it 10 grains to the ounce in all. This paper was prepared the same as before in other respects,—exposed ten minutes with $\frac{1}{4}$ inch diaphragm, and developed six hours afterwards by floating on gallic acid upon the slide-glass. This is quite as well defined as the others, and certainly as clean.

In conclusion, I would remark that the papers will not keep many hours after being sensitized, and that the only advantages to be expected are a diminution of the time of exposure and development, and an extra density in the negative.

Since the above paper was read, Mr. Parr has communicated the following remarks:—"Further experiments have convinced me that the only correct method of using the acetate of soda to produce an acetate of silver in the paper is to apply it after sensitizing. If used in the iodizing bath, the sensibility of the paper gradually diminishes with the age of the iodized paper and that of the bath.

"The following method is simple, and gives a good result:—Having sensitized the papers (iodized in the usual way) on the slide-glasses, and drained off the superfluous nitrate without wetting the blacks, apply to each a piece of common paper, of the same dimensions, saturated with a 20-grain solution of acetate of soda to the ounce of water, and allow them to remain level for two minutes. The superfluous acetate is now to be removed by draining and scraping the backs of the papers, when they may be placed in the slide, with an extra glass on each, and intervening cardboards and paper to keep all in contact when closed."

METHOD OF DECOLORIZING NITRATE SOLUTION.

To the Editor of the Photographic Journal:

Peckham Rye, April, 21, 1856.

Dear Sir,—I forward the enclosed, hoping it may be worthy of insertion in your paper; it was communicated to me, and I have found it answer admirably.

For decolorizing a solution of nitrate of silver, add 10 grains of kaolin, finely powdered, to each ounce of nitrate solution (60 grs. to the ounce), when a kind of effervescence takes place—allow to subside—and a dark precipitate is thrown down, leaving the solution perfectly clear, which is to be poured off as required, but to be returned to the bottle with the precipitate. The kaolin is to be procured at a small cost, at Jackson and Townsend's, Bishopgate Street Within.

I am, my dear Sir, your obedient servant, C. S.

For the Photographic and Fine Art Journal.

NOTES

On the Production of Life-Size Photographs of any Dimensions.*

BY A PRACTICAL PHOTOGRAPHER.

CHAPTER III.

MANIPULATIONS.

1. *Iodizing the Paper.*—This can be done by daylight, still, I would avoid too strong a light. It is curious enough that the ideas of different operators vary so much in this respect, as some recommend to expose the paper to sunlight, and others to keep it in the dark. Now I recommend the middle way, though I am not prepared to defend its adoption. That paper prepared with pure iodide of silver is sensitive to light, I have had sufficient proof of, and therefore it is plain that its being exposed to direct sunlight before sensitizing must have *some* effect, but of what nature, nobody I think has yet tried to explain. That it should have a favorable effect for the after production of a picture, perhaps on its sensitiveness, is not at all unlikely.

Take a clean board (one to be used for this purpose alone), fasten your paper at the upper right hand corner to it, with one of the wooden cloth pins (see chap. II. §1), kept also for that purpose alone. Pour your iodizing solution into a clean tumbler, dip a Buckles brush (see chap. II. §4) into it and brush the iodizing solution evenly and systematically (not at random) over your paper, which a little practice will soon teach how to accomplish. After thus brushing over 5 or 6 sheets, take the first and immerse it into clean water, then iodize another sheet, and then immerse the second into the same water with the first, and so on. The paper ought not to be immersed into water until all surface moisture has disappeared. This washing of the paper has to be continued for several hours, and the water changed four or five times. The paper can then be hung up to dry, which is best done by using the wooden clips on a string stretched across the room. After drying, preserve the paper shielded from dampness and dust. Its color will be a pale straw yellow.

2. *Sitting the Picture.*—This Chapter brings us now to the description of the most interesting, if not the most difficult part of the operation. It is nearly impossible to convey in words all that has to be attended to, and all the various shifts which suggest themselves while operating—so as always to get the desired effect, under all the varying circumstances of light, temperature, sensitiveness of paper, and intensity of negative. Operating with the sun's disk, always remains the most pleasant, though not perhaps the most convenient, as in this case you have to follow the course of the sun with your reflector. The reflected sun's image will be seen to travel downwards on the paper in the forenoon, and upwards in the afternoon. Knowing this, it is easy to arrange the reflector so that the sun's disk will be just where it is wanted at the time the paper has been excited and pinned up. As soon as the ground-glass is placed in front of the negative, the light will seem to be evenly diffused over the whole sheet of paper, still the action will be more energetic over the disk then around it. Therefore, when an even action over the whole surface is desired, the sun's disk should be made to cover the whole sheet of paper. Each lens or combination of lenses forms a differently sized image of the sun, according to its diameter and length of focus. For this reason the size of the negative has to be adapted to the diameter of the lens ; in other words, for each particular camera the size of the negative will have to be varied, so as to come within the range of the sun's disk. Now it must not be forgotten, that the smaller the diaphragm used, the smaller will the disk be. For general purposes, throwing the strongest light on the most intense part of the negative, or right on its centre, will be found sufficient, and by using a diaphragm proportioned to the strength of light and transparency of the negative, the resulting picture will be perfect enough for the hand of the painter. It is true that in developing, something might be done to equalize, by lengthening the development outside the action of the sun's disk; but this will not be found to do much good, as difference of action during exposure always produces difference of tone in the finished photograph

After having fastened the negative in its place, arranged the reflector and replaced the ground-glass, it is next necessary to adjust the exposure-board or tablet at the proper distance for the elargement intended. This is done, after entering the dark room through the door I, figs. 1 & 2, and by moving both the tube and the tablet (the first by means of the sliding box), to different distances from the negative—a little practice will soon show how to do it quickly and without much guessing.

The excited paper will have to be placed just so, that the transmitted image will fall on its centre; to do this it is best to use a sheet of plain white paper of the exact size of the iodized sheet, on which to adjust the size and focus and so as to be able to pin the excited paper exactly to the same place, I advise to raise or lower the tablet and move it to the right, so as always to have the upper left hand corner (whatever the size of sheet), correspond with the upper left hand corner of the tablet; in this way it will be next to impossible to miss the exact place.

3. After having gone through the above arrangements, take a sheet of iodized paper and wet it evenly by means of a cotton brush, with the following solution:

Distilled water	1 ounce.
Aceto-nitrate of silver	2 drachms.
Gallic acid sol.	2 drachms.

As soon as the sheet is evenly wetted all over, pin it on to the tablet. Take the lamp (which has been used behind a yellow glass screen for exciting), and set it on the shelf near the door, reducing the flame to the smallest possible compass. The next thing to be done, is to take the caps off the tube and to watch the progress of the light's action. After a few minutes, replace the cap and look at the paper by the light of the lamp. Practice alone will teach the operator when to stop the action of the light, as much depends on the quality of the negative.

Being able to watch the progressing action of light in this manner of operating, enables us to make a good copy of almost any kind of negative, from the faintest in intensity to the most opaque. As soon as the light's action is considered sufficient, remove the paper and wash it over with gallic acid sol. If the light's action has been rather weak, it will sometimes be necessary to add some aceto-nitrate of silver to the gallic acid.

The picture should not be brought out too much by the light; as a general rule the gallic acid should have at least from 5 to 10 minutes to act, before the picture is developed in all its details. If the gallic acid has to act much *longer* the whites will generally lose their brilliancy and become grey; and if it acts in *less* time, the picture is likely to turn red in the hyposulphite bath.

The paper must never be allowed to get dry during exposure or development, should the light be so weak or the negative so intense, that the exposure has to be prolonged, it will be prudent to give the paper another washing with the exciting solution, of course without removing it from the tablet. After development the picture has to be washed in the dark in water, so as to remove all the gallic acid; and thus to be dipped into the hyposulphite of soda solution until all the yellow iodide is dissolved out of the paper, this will generally take from 15 to 30

* Continued from page 204.

minutes. The impression has then to be washed with the same care which is bestowed on common printed pictures fixed by hyposulphite of soda. The removal of the iodide of silver is by no means necessary for fixing the picture as it would be just as lasting with it. The picture can be called fixed, after the gallic. acid has been washed off with water.

Here, Mr. Editor, I shall close my "Notes" for the present, they may be considered by some incomplete, but I hope they will not be found *incorrect;* as they are given with a sincere wish for improvement in this beautiful art, which can best be arrived at by interchange of experience among the profession and not by the close selfishness at present so very prevalent. (The most ridiculous thing is certainly, that the editor of a contemporary Journal devoted to this Art, and who most urgently advocates more liberality in communication, should himself advertise "superior processes" for sale at a premium! So much for the editor being a photographer himself. Yours truly, O. J. W.

[It has been suggested to us to request our correspondent to continue his *Notes*, so as to include the process for taking photographs on *canvas*, and we trust he will do so. His articles thus far have given much satisfaction, and we have reason to believe will tend greatly towards making others more communicative.—Ed.]

From the Jour. of the Phot. Soc.

PHOTOGRAPHIC STEALINGS.

[This will suit all climates.—Ed. *Photo. Jour.*]

An allusion will be found in the Report of the last Meeting of the Society to a subject which demands the serious attention of photographers; namely, the facility and impunity with which pictures obtained by light may be copied, multiplied, and then sold as originals, without the knowledge or consent of the authors. Such a dishonest practice has been for some time complained of among painters; and through the present defective state of the law of copyright, pictures have been sold with eminent artists' names attached, who never even saw the canvas they were painted on, but who yet could obtain no redress for the injury and forgery. The abuse and fraud has indeed at last become so galling, that it has been thought needful to bring it before the Legislature, and procure, if possible, legal protection and redress. But if painters are subjected to such plunder, how much more so are photographers? The process of imitation in painting or sculpture must of necessity be laborious, and require some artistic talent and dexterity, and must be therefore, in a degree, limited; but in the case of a photograph, nothing is easier than for a mere tyro, if dishonestly disposed, to procure good pictures unknown to the artist, to copy them even to the name in a few minutes, and then to pass off as genuine productions spurious impressions of works which have cost their authors time, trouble, and expense to procure and perfect.

And not only is the rightful owner injured in pocket by such fraudulent proceeding, but in character also; for the copy cannot be as good as the picture pirated; it must lose somewhat in definition and vigor; and thus the supposed author suffers in credit and reputation by having this weak changeling fathered upon him as his own own offspring. Unfortunately, these observations are not made from any imaginary fear of what *may* happen. Such things have occurred, and the practice, it is to be feared, is on the increase. It is high time that a strong effort should be made to check it, both for the sake of the hard-working and deserving photographer and for the credit of the Art itself. Mr. Chambers, M.P., has taken up the subject, and has thus earned the warm thanks of all artists, nay more, of all honest men; and any well-authenticated facts bearing upon the point will strengthen his intended application for the amendment of the law, and if sent to the Secretary of the Photographic Society, will be forwarded by him to those gentlemen who are preparing the case before it is submitted to the Legislature.

PHOTOGRAPHIC ITEMS.

Photographers have been of late so ambitious as to quit the common objects of earth; and while one has been soaring to the heavens, another has dived to the bottom of the sea.

Father Secchi, Director of the Observatory at Rome, has put forth a photograph of a crater of the Moon called Copernicus, in which the double circle of hills which surrounds the basin, the great rocks, and the interior strewn with boulders are distinctly shown. But it is unfair to compare this with other photographs of the same luminary, as it is not produced directly from the moon, but from a drawing made during six months' careful study; and therefore its accuracy depends upon the fidelity of the draughtsman, and not on the unerring nature of a photograph obtained immediately from the object depicted.

In England, a portion of Weymouth Bay taken at the depth of three fathoms has been photographed by Mr. Thompson. He has communicated his method to the Journal of the Society of Arts, and he states that two curious results followed the immersion of the camera; one, that the image was formed on the plate in its natural position, and not inverted; another, that though the salt-water got into the slide, it did not materially injure the plate. How can the first statement be accounted for?

Although the picture is not very satisfactory as a work of art, yet it establishes a fact the application of which may be of immense use and advantage to science.

Dr. Diamond has communicated to the Royal Society a paper on Photography as applied to the Illustration of Insanity. It is of so important and interesting a nature, that a more detailed account will be inserted in another Number, when the space which it merits can be allotted to it.

All brother photographers must unite in sincere and profound sorrow at the death of Mr. Maxwell Lyte. A skilful, scientific, and enthusiastic promoter of photography, both as a science and an art, his name is known and appreciated, not only by the Members of the Photographic Society and by the readers of the Journal, but by all who are interested in the study; amd it must be felt by each as an individual as well as a universal loss that he should have been so early and so prematurely snatched away. These who were happy enough to be personally acquainted with him, have the further grief of being deprived of a highly-gifted and warm-hearted friend. The name of Maxwell Lyte will surely long live in the grateful memory of photographers.

Personal & Art Intelligence.

— Again Mr. (we beg pardon, the Rev.) L. L. Hill, or rather his publishers, are out with a circular in regard to the wonderful Hillotype, and again is the Daguerreau community set all agog—we had almost said thrown into a feverish state of excitement—at another prospect of its speedy accomplishment; but we fear the hopes of the sanguine are destined to be crushed as low as on the three former occasions. From a perusal of the table of contents we are led to think that facetia will be its prominent characteristic; for we find the following as some of the headings to the chapters: *Laughable Experiments, — Poisons, — Explanations, — Effects on the Public Mind,— Eight Thousand Letters,— Course of the Photographic Journals —The "Infernal Committee,"—Life Threatened,—My Revolver,—Col. Pratt's dog,—The Midnight Alarm,—Narrow escape of the Enemy,—My Second Marriage,—That 'foulest whelp of sin,'—Human Nature in its blackest aparel,"* and a few more of the same nature.

In this circular we find all the old stereotyped phrases, periods, exclamations, whinnings, complaints, expectations, certificates, etc., that have filled those of former years, with the "agony piled on" to a little higher extent. We have the opinions of many gentlemen who have called upon Messrs. Robinson & Caswell and seen the pictures of Mr. Hill, and of these Mr. S. A. Holmes, of this city, is the only one who has spoken of them in a favorable light as compared with the

praises bestowed on them by the inventor. One gentleman, who is a critic in such matters, asserts that all now on exhibition in this city are mere transfers, and were never taken in the camera. Of this we are not prepared to speak; but if we can be so fortunate as to get a glimpse of these Hillotypes we shall say what we think of this assertion in our next issue. From all we can learn we see no reason to change the opinion we have expressed very fully, in former years. Mr. Hill has obtained a species of naturally colored daguerreotype, far from being the perfection which he has repeatedly described in his circulars.

In our June 1851 number we held the following language:—"Under these circumstances, and from these statements of Mr. Hill himself, we arrive at the conclusion, that, although there may be no doubt as to the fact of his having succeeded in obtaining daguerreotypes in the natural colors, if we are to depend wholly upon him for a successful termination of the process, it will never be accomplished." The following paragraph from Mr. Hill's *last* "Circular" will show how far incorrect we were in this assertion.

"1. MY WORK IS DONE. I have, to use the words of my friend, *Prof. Morse*, "laid the foundation on which will be built a SPLENDID STRUCTURE." *True, as I now see, my old hope of bringing the process to absolute perfection, in all its details, was a fallacy. Inventors never do this—I have not done it—were I to work fifty years I might come short of it*—but THIS I HAVE DONE, namely, I have produced at least *three thousand pictures in natural colors, one thousand of which are in all the* DELICACY, BEAUTY, *and* MAGNIFICENSE of *nature's own coloring—such pictures as we see on the ground glass of the camera.* This, also, I CAN DO AGAIN, if I have health to work."

It will be seen by this that the fact we arrived at from the first statement of Mr. Hill, he, after five years "persevering toil" is forced to acknowledge, and make that acknowledgment public. As, on a former occasion, we repudiate the idea that this fact militates against his scientific abilities, but merely goes to show how much better it would have been for his reputation as well as for his pockets, had he paid more attention to the advice of disinterested than of those interested "friends" who flocked around him like bees around a molasses barrel, on the first announcement of his discovery. We copy Mr. Hill's plan for the dissemination of his process. We have no fault to find with it, provided all he says in regard to that process is correct. It is indeed a very democratic way of disposing of it; but from the fact which he announces in this last circular, viz., that he has not succeeded in perfecting it, we cannot advise any to purchase the book unless they consider themselves capable in a scientific point, and also in pocket, to push Mr. Hill's experiments to a more decided practical result. We can but hope that in the hands of some one it may be perfected, and for this reason we are not sorry Mr. Hill has concluded to give it in this form; it is only a slight modification of the plan proposed by us five years ago. Mr. Hill announces his plan as follows:

"Nothing short of a *full, accurate,* and *well-written* TREATISE would be at all commensurate with the greatness of this subject. I *could not* write out my knowledge of this grand theme on a few pages. I understand this subject in all its length and breadth, and I propose to make a clean breast of it, and give you the fruit of my hard study on this *one idea,* IN ALL ITS RAMIFICATIONS, for years. The *main process* I shall give in a chapter by itself, and in a plain, simple style. But the book will give you a comprehensive view of the WHOLE SUBJECT. Examine the *table of contents*, in another part of this pamphlet, and judge for yourselves whether I have had anything to write about, and form some estimate, as you naturally will, of the vast amount of mental effort and continuous experimenting required to produce such a book, on an *original subject*, wherein *very* little aid is to be had from other writers.

A *main feature* in my plan is its adaptation to the pecuniary circumstances of all classes. There are few, if any, who cannot raise the amount charged; and those who swim in riches will not, I am sure, feel very deeply grieved because they are not required to pay more. Originally I contemplated a *Patent.*—Whether I now apply for one will depend upon the *votes* of a majority of my subscribers. A *copyright* of the book I have already secured.*

Selling *County* and *Town Rights* has also entered into my former devisings. This I have given up, as *anti-democratic,* and as giving the *poor but a poor chance* in competition with the rich. Besides, the arrangement would be short-lived; for, in this piratical age, the lines would soon be broken, in spite of an "army with banners."

This plan may not please all; but it *gives all an equal chance*—and I shall thus fulfil my original pledge."

— M. M. Griswold.—We cannot entirely agree with you. The process of Mr. Willoughby is not entirely original, we admit, precisely the same process having been used in this city for several months. Our notices were copied from western papers before seeing any specimens of the work. The picture we have had sent to us, we have examined carefully and compared it with those executed in this city during the last year, and we find they are the same. We have seen some which having been well done give a very pleasing effect. We cannot suppose that Mr. Willoughby was in the least conversant with the fact, that ambrotypes had been colored in a similar manner, and therefore the idea was quite original with him. We regret to be obliged thus to put a damper upon the expectations of our friends in Ohio, but truth requires it at our hands and she must be obeyed. In regard to the patent, it only proves what inefficient examiners we have in our patent office.

— L. W. Keen.—We can at present give you no further information on the subject than that already published; but we have the promise of further developments at an early day.

— P. E. Gibbs.—You are right in supposing that it is our wish and aim to render exact justice to all, and we give place without hesitation to the communication in question. We regret that you have thought proper to enter into litigation in regard to the *ambrotype,* because we are convinced that, if the facts are brought out on the trial, you will lose your cause. We also regret it because it has excited unfriendly relations between two who should, on the contrary, feel the liveliest interest in each other, for both of you gentlemen evince a true spirit of devotion to the Art in which you are engaged; you both have hosts of warm friends, and you both have that respect for each other, that should not be destroyed for a mere "will-o'-the-wisp."

— D. C. Ahren.—We answered you by letter; but as others may wish the like information we will here state, that a *gutta-percha* bath may be repaired—if it has not become rotten by the action of the solution—which we find is often the case,—by softening it in hot water, and pressing the seams together under a weight, until they become again hardened. You will find a careful perusal of Monckhoven's Chapter on Collodion to assist you materially in all your troubles.

Messrs. Dodge & Wenderoth, Nashville, Tenn.—These gentlemen have sent us some of the finest views and portraits we have seen executed by American artists. They approach, in detail, effect of light and shade, sharpness, tone and general execution, nearer those of the French photographs, than any that have been shown us. They are such pictures as we wish to illustrate our Journal with, and when we can do so we shall be almost satisfied. Some of them are exquisite. We have replied to your queries by letter. The *Hallotype* we still consider all we have said about it. We really do not think they can be surpassed by the Hillotype; and as there are no further experiments to be made in order to make the process practical, there can be no risk in purchasing as soon as it is offered for sale.

— J. F. Harrison.—This young artist of Oshkosh, Wis., has sent us a very good ambrotype, entitled the "Bachelor's Sunday Morning," for which he is deserving of much credit. The design is very well executed, although the bachelor is rather too

* It appears that having sold out his invention, the purchasers have determined to take out a patent, and have made the necessary application.—Ed.

youthful to carry ont the idea to perfection. The other details are more in keeping with what we conceive must be the fate of a crusty, miserable old bachelor, with holes in his stockings, and rents in his garments.

— A correspondent (R. L. D.) commnnicates the following cutting from a newspaper, and asks for an explanation. We submit it to the consideration of those who are more versed in American *discoveries* than ourselves:—

"Photographs have lately been taken in Boston, U. S. on silk, and the effect of a pure amber color upon a white silk ground is found to be very fine. The portraits are said to appear like exquisite line engravings."

The above paragraph is going the rounds of the English and French papers, some of which seem to think that it is a mere stretch of the imagination; and with their customary meanness in regard to American improvements and inventions, doubt its truth; but the fact is self evident. The Messrs. Meade & Bro., of this city, were the first to apply photography to this purpose, and we have seen some of the finest portraits and views beautifully impressed upon white silk, which came out of the process perfectly pure and clean, with the images perfect in all their detail.

— The *Cincinnati Columbian* furnishes us the following:—

"Notwithstanding the many contributions to the arts and sciences already made by Cincinnati, on which she could well afford to rest for a time, the daily evidences before us show that the limits to her progress have not been fixed, nor is there any immediate prospect of such a state of affairs.

"In the Photographic art, particularly, has she made many improvements, to which the excellence of the daguerreotypes, solographs, ambrotypes and melainotypes, on exhibition at all of her galleries, bear ample testimony; they are remarkable for clearness, smoothness, strength and beauty of tone, and are so replete with happy artistic effects, that none can view them and not be pleased.

"The last triumph has been reserved for E. C. Hawkins, the veteran daguerreotypist of the Ohio valley, who has been making for a year past a picture that must supercede all others, as it is now being presented to the public by Messrs. Faris & Hawkins, in the Melodeon gallery. The new discovery is a positive Photograph on glass, colored in oil, and, as finished by Vaughn or Beard, is artistic beyond description. It is upon a heavy, clear French glass plate, which imparts an enamelled appearance to the picture, and is not easily broken, nor effaced. No studied expression of ours, however carefully worded, or appropriate to the case, could give an over-drawn idea of this charming style of Photograph, and, as a picture that combines more truthfulness, boldness, clearness of detail, elegance of finish, and roundness and fullness of expression, it must be seen and critically examined, to be fully appreciated.

"We are pleased to learn that Mr. Hawkins had his caveat filed in November, 1855, and that he is the first in the field. As a Cincinnatian, we feel proud of the discovery, and know that our pride will be shared by all who examine the new pictnres."

The known reputation of Messrs. Faris & Hawkins is sufficient guarantee for the truth of what the *Columbian* advances.

The "New York School of Design for Women," commences its fifth year on Monday, Sept. 15. This school is established for the instruction of young ladies in the Art of Design and wood engraving, and is an Institution well worthy the support of our countrymen. The proficiency of the young ladies here taught, may be inferred from the initial letters which we monthly present to our readers, they being executed by pupils of this school.

— We would suggest to our subscribers when they send us specimens of their work, to accompany them by a description of the process by which they are executed, for publication. This will materially assist in the improvement of the Art, and be most acceptable to our readers.

— One of our subscribers has sent us the following:—

Mr. Snelling—*Dear Sir:* There is probably no art or science which has made such rapid strides towards perfection as Photography. Almost every day we hear of some new and useful improvement, which tend to hasten its ultimate perfection. I had the pleasure of trying, a few days since, a novel and new style of buff, which is intended to do away altogether with the tedious task of rubbing with cotton and rotten-stone. It will do all this, and it is certainly cleaner and more uniform than the old process. From the short trial I gave it, I believe that it will eventually supercede any other method I know of. It is a "labor saving machine," and will be hailed as such by daguerreotypers generally. The price is only five dollars, and can be had of Mr. E. Anthony, New York. Dobbs & Birmingham are the agents, Phila.

I suppose that the Balsam patent is dead and buried with appropriate ceremonies; some one should write an obituary upon its death. It has made a good deal of stir in the world, and should not be allowed to leave it, without some appropriate notice. I believe that I have done my part, in following it to the grave, and will now finish, by furnishing an epitaph for its tombstone. Here it is:

All that is left of the patent and the patent case,
Is here* confined within this narrow space;
Balsam had no healing virtues in it,
To save it from the grave a single minute.
Its fate was *sealed*. I knew its doom,—
An *extra glass* has hurried many to the tomb.

Yours, very truly,
M. P. Simons.

We are sorry to spoil the point of this epitaph; but the fact is, that the "*wise men*" of the Patent Office have granted Mr. Cutting a "re-issue;" for the *benefit*, we suppose, of the *lawyers*.

— J. A. Davidson.—Your communication came too late for this number; it will appear in our next.

— It will be perceived that we issue this number without an illustration. This we do because we are not satisfied with those we have had printed, and it is our intention not to insert any more until we can give them much better; but our subscribers may depend upon having their full compliment by the end of the year. Our arrangements for printing are perfected and our only trouble is in getting a person capable of doing it properly. As soon as we succeed in this we can print sufficiently rapid to make good all our promises for this year.

— Four fifths of our subscribers are in arrears for this years subscription, and as we want the money they will oblige us by forwarding it with the least possible delay.

— A Bisbee, of Columbus, Ohio, has obtained a patent for his beautiful *Sphereotypes*. *Claim*.—"Making the border of the picture transparent, and placing the mat back of the picture." We have already spoken of these pictures.

— J. H. Tatum, Baltimore, Md., has received a patent (dated May 15th, 1856) *for a preparation of oil ground to receive Photographic Impressions*. His *claim* is; "The mode of preparing and rendering oil (or oleaginous) bodies, grounds, or surfaces, impressible or sensitive to the photographic art, by the temporary destruction or chemical change of the oil, or oleoginous matter, on the immediate surface only, by the use of spirits of wine and alkaline solutions, or their equivalents, and after fixing the impressions, by the use of hyposulphite of soda, the use of dilute acid, by which last application the alkalies are neutralized, and the oil restored, with the impression permanent upon the surface." We have seen impressions made in this way and can recommend the process.

— Webster & Bro., have shown us a few specimens of the *Spereotype* executed by themselves. To say that they are beautiful is faint praise. There is a roundness and clearness about them that recommends them decidedly to the esteem of all who can appreciate fine effect, and their delicacy is certainly exquisite. There can be no hesitation on the part of any one in deciding between the *Sphereotype* and *Ambrotype*, in giving the former the preference. Like the Ambrotype, however, there is still some opportunity for improvement, for although very beautiful, a little more solidity would convey a better idea of poor humanity.

* The Book of records in the U. S. Court, Richmond, Va.

From the Jour. of the Phot. Soc.

ON THE CHEMISTRY OF THE PHOTOGRAPHIC IMAGE.

BY T. F. HARDWICH, ESQ.

GENTLEMEN.—We are assembled this evening to discuss a subject which has a most important bearing upon the extension of the Photographic Art; for until the real nature of the action of light upon the salts of silver is determined, it cannot be expected that the proper conditions for the preservation of the photograph will be ascertained. Very recently I had the honor of communicating a paper to your Society, in which I attempted to show that the oxides of silver combine chemically with certain varieties of organic matter, and that the photographic image on paper consists of such a combination More recent experiments have strengthened the view then advanced, and have enabled me to produce the coloring matter of the picture in a fit state for analysis.

The term 'photographic image' is perhaps rather an indefinite one, since the action of light produces effects upon sensitive surfaces variously prepared; and even if we confine ourselves to the common photographic processes upon the salts of silver, it is evident that there are great differences between photographs developed on collodion or iodized Talbotype paper, and photographic prints produced by the direct action of light upon paper prepared with chloride of silver. It is more particularly to the latter that my attention has been directed, although I have studied the composition of the developed photographs, and attempted to show the relation which they bear to prints obtained by direct exposure to light.

In printing paper positives, a mixture of chloride and nitrate of silver is used. The presence of the chloride has an effect upon the sensitiveness, and modifies slightly the color and properties of the image; but the essential elements in the process are simply organic matter and oxide of silver: hence the image must necessarily consist either of metallic silver—of a low oxide of silver—or of a compound of silver, or one of its oxides, with organic matter.

There are some photographs which appear to consist of pure silver; such for instance as collodion direct positives developed with protonitrate of iron. The image in this case amalgamates with hot mercury, has a metallic lustre, and reflects white light. The paper photograph, on the other hand, has a dark reflexion, representing the *shadows* of a picture, and giving a negative copy of the original object.

Between these two varieties of photograph there is also an essential difference in properties. The bright metallic images are comparatively unaffected by cyanide of potassium; but the paper proofs readily dissolve in cyanide of potassium, and must be fixed by a chemical agent of less power, such as ammonia or the hyposulphite of soda.

The action of a soluble sulphuret affords another distinguishing test. Paper photographs fade and become yellow in a solution of a sulphuret; but metallic positives on collodion retain all their intensity after a prolonged immersion.

These striking differences in physical appearance and in properties seem to indicate a corresponding difference in composition, and in pursuing the investigation further we find that such really exists. The images, which are dark in color, and lose their intensity when strongly sulphuretted, are, as a rule, obtained by the reducing action of light and organic matter combined; but the images which appear metallic after fixing are formed when organic matter is absent, or when, if present, it is of a kind which has little or no reducing action upon oxide of silver. This was alluded to in my last paper, where it was shown that chloride of silver, supported on a film of dry collodion, when exposed to light, and treated with ammonia, gives a metallic image indestructible by sulphur; whereas chloride of silver *on albumen* yields, under the same circumstances, a non-metallic image with the properties of the paper photograph: the difference in the two cases depending upon the fact that pyroxyline has little or no reducing action upon the salts of silver; whereas albumen assists the deoxidizing action of the light, and combines with the product of the reduction.

The argument therefore may be stated as follows:—There are certain organic bodies which have an affinity for a low oxide of silver. If such substances are employed in a photographic process, the image, whether produced by the direct action of light, or by the joint action of light and a developer*, will not consist of metallic silver, but will be a compound of an oxide of silver with the organic substance, or a product of its oxidation. If no organic substance, possessing the required affinity, be present, the image, after fixing, will be metallic, and different both in color and properties.

Amongst organic bodies, those of animal origin, such as albumen, caseine and gelatine, are remarkable for the facility with which they unite with oxides of silver. The following experiments will illustrate this:—

Take the white of an egg diluted with a large bulk of water, and drop in an excess of nitrate of silver. A white coagulum forms, which contains protoxide of silver united with albumen, and has been termed "albuminate of silver." On exposure to a bright light this substance assumes a brick-red color, and undergoes an important alteration in properties; becoming almost insoluble in dilute ammonia, or dilute solution of hyposulphite of soda, both of which readily dissolve the unaltered albuminate of silver. The change in color from white to red is plainly due to a deoxidizing action of the light, since the same effect can be produced by passing hydrogen gas over the compound at a temperature of 212°. The result of the reduction, however, is not a mere mixture of metallic silver and albumen, as will at once be seen from the following statement of the properties of the red coagulum:—It is sparingly soluble in albumen, tinging it yellow; sparingly soluble in solution of nitrate of silver, forming a brown liquid; dissolved by ammonia at 212°, giving a deep red solution. Boiling potash, in which metallic silver and oxide of silver are insoluble, also takes up the red albuminate of silver without leaving any residue.

After repeated washing with dilute ammonia and water to remove the excess of silver salts, a red powder remains which communicates opacity to a very large bulk of distilled water. The red and turbid liquid treated with hydrosulphate of ammonia is first rendered much darker in color, then assumes a greenish tint by transmitted light, and lastly becomes pale yellow and translucent; the changes in color in fact being exactly the same as when an albumenized paper photograph is treated with sulphuretted hydrogen. Oxidizing agents also remove the red color, converting the compound into a pale yellow substance. Strong aqueous hyposulphite of soda dissolves the red powder, but, unlike potash and ammonia, *decomposes* it in the act of solution. Cyanide of potassium also takes it up readily, forming a colorless solution.

Caseine resembles albumen in its action on nitrate of silver, but with the exception of the fact that the white coagulum first formed becomes brick-red on exposure to light, the properties of the compound have not been examined.

Gelatine produces no precipitate in solution of nitrate of silver, and does not accelerate the action of light upon the prepared photographic paper so strongly as the two bodies last mentioned. But if a sheet of gelatine be allowed to imbibe a

* The properties of a developed image vary to some extent with the length of time the light has acted. In many conditions of the film (particularly so in presence of nitrites and some varieties of organic matter) over-exposure in the camera tends to the production of a developed image which is dark by reflected light, and red by transmitted light, and which reacts with tests more in the manner of a paper photograph. Under-exposure, on the other hand, favors the deposition of a metallic image, which may be burnished by rubbing.

solution of nitrate of silver until it has swelled up, the action of light produces a series of changes in color, and modifies the properties of the compound. It first assumes a clear yellow tint, then becomes brown, and lastly, of a dark ruby-red approaching to black. When treated with boiling water it swells up and becomes granular on the surface, but does not dissolve. In other respects its properties are the same as those of the corresponding silver compound with albumen, and, like it, it is soluble in boiling solution of potash, forming a clear red liquid, which is decolorized by hydrosulphate of ammonia.

It is therefore certain that the three animal substances mentioned, form chemical compounds with reduced oxide of silver, and as they are all constantly employed in the preparation of sensitive photographic paper, the true nature of the image is proved beyond a doubt. Other organic bodies may be substituted for albumen or gelatine, as vehicles for supporting the layer of silver salt. Even pure cellulose, as occurring in Swedish filtering paper, will suffice to reduce the ammoniacal oxide of silver in a strong light, but the action is very slow and imperfect if no chloride be present. The gelatinous substance found in Iceland moss has a greatly accelerating effect. So also have citrate, tartrate, oxalate of silver, &c. In all these cases, the most characteristic properties of the image will remain the same as if animal matters had been employed, but the relative proportions of silver and organic matter will be liable to some variation, which may be shown as follows:—

All photographs of the class of which we are now speaking, agree in being faded more or less by the action of sulphur, but inasmuch as the loss of intensity is more decided in some cases than in others, we are furnished with a means of estimating comparatively the actual amount of silver contained in the image; for in proportion as the quantity of silver is greater, so will the picture be more vigorous after the sulphuration is complete. This mode of analysis shows that the use of animal matters tends to give an image containing a minimum of silver, whereas an increase in the quantity of chloride of silver in the paper, and especially the use of ammoniacal oxide of silver in rendering the sheets sensitive, darkens the color of the image, and adds to the proportion of silver. It is observable, however, that in those photographs which approach the most nearly of all to the metallic condition, such as the image developed on paper prepared with iodide of silver, the tones are deficient in intensity when viewed by reflected light, the organic element giving increased softness and depth of color. If this were not the case, the Talbotype negative process would be the best adapted for photographic printing, since the image so prepared, possesses unusual permanence under the influence of sulphuretting and oxidizing agents, which are the main causes of the fading of ordinary photographs.

The action of sulphur upon the coloring matter of photographs is of such practical importance as regards the further development of the art, that the attention of scientific men cannot be too much directed to it. The point of especial interest lies in the fact that there is a stage at which the print is improved in appearance by the sulphur, but is yet rendered so unstable that by the simple action of air and moisture it passes from black into yellow, and becomes faded. The exact composition of the deposit in the early or black stage of sulphuration is not at present determined, but the faded prints appear to consist of sulphuret of silver in a state of minute division. The instability of the proofs blackened by sulphur, however, has no doubt been one of the principal causes of the deterioration of photographs by keeping, and if this point had been recognized from the first, it is probable that the majority of them would be as good at the present time as they were when first printed. Still it must be allowed that paper photographs are considerably less permanent under injurious conditions than engravings and paintings in oil. The quantity of silver they contain is infinitesimally small, and hence the action of sulphur destroys the picture. The association of the silver with organic matter also facilitates oxidation and the action of other destructive tests, so that to keep them from fading they must be protected from acid fumes and impurities of various kinds sometimes present in the atmosphere.

Prof. Hunt.—I rise for the sake, in the first place, of thanking Mr. Hardwich for the experiments which he has continued, an account of which he has brought before the Society this evening, and also for the purpose of stating my opinion, that I do not feel satisfied with the conclusion at which Mr. Hardwich has arrived; though probably he may be quite correct. On a former occasion I stated my firm conviction, that in all cases the photographic image was formed by metallic silver in a state of minute division. In the majority of cases I still hold that opinion, but I would qualify it now by saying, that I am not prepared to state, after what Mr. Hardwich has informed us this evening, that the image in combination with albumen may be purely metallic silver. It is *possible* it may be such a combination as Mr. Hardwich supposes. Further experiments, however, appear to me necessary upon that point. We know that carbon is an element in all these organic bodies, and plays a most important part, not merely under the influence of light, but in absolute darkness, especially upon the salts of silver.

I think the most interesting, certainly one of the most instructive, experiments with which I am acquainted, is to place a stick of fresh-burnt charcoal in a solution of nitrate of silver in the dark. If we try this experiment, we shall find in a short time, that is in about a week or ten days, that the stick of charcoal will be completely covered with a beautiful coating of metallic silver, or radiating from the charcoal in all directions we shall have acicular crystals of silver. I merely mention this as showing the important part which carbon plays in all these organic compounds.

I feel convinced, although I have not experiments to bear me out, that the results we have seen of the extreme sensitiveness of the collodion process is in a great measure due to the instability of the elements of collodion, and that the carbon it contains under the influence of the solar radiation at once effects the reduction which gives rise to these instantaneous pictures. When we find that pure chloride of silver exposed to the action of light upon a glass plate quite free from organic matter *does* darken, and that the blackened matter is certainly metallic silver in what I may call an allotropic condition; when we find in all the processes with which I am acquainted (with the exception of albumen), that when the blackening action has gone on sufficiently far, the black substance upon the paper *does* act in all its chemical relations as if it were metallic silver, that is, it will not be dissolved by ammonia, as suboxide of silver would be, but that it will be dissolved with nitric acid, with manifestations of nitrous fumes;—all these things appear still to render it highly probable, in the majority of cases at least, that the photographic image is formed of metallic silver in a state of minute division. Of course I make these remarks with all humility.

Dr. Miller.—Although a stranger, perhaps I may be allowed to make one or two remarks upon the very interesting paper my friend Mr. Hardwich has just brought before us. I should state, they will be rather in support of his views than opposed to him. I myself had the pleasure of seeing some of these experiments performed by him, and I must say that upon my own mind a very strong impression of the truth of the views advocated by Mr. Hardwich was produced by witnessing them.

The observations with which Mr. Hunt stated an experiment in which he took a piece of charcoal and immersed it in a solution of nitrate of silver, kept it in the dark for some time, and found that it effected the reduction of the silver either in an amorphous or crystallized form. From that Mr. Hunt draws the conclusion, that the metallic silver is reduced by the agency of charcoal. I should suppose, however, that this experiment admits of a different interpretation. I would merely call to the recollection of Mr. Hunt the experiment which Mr. Smee performed, that of making a piece of charcoal the positive electrode of a voltaic battery in dilute sulphuric acid. Hydrogen will thus be evolved upon the surface of the charcoal, and you will obtain a mechanical combination of hydrogen with the charcoal. If this fragment of charcoal thus saturated with hydrogen be

thrown into a solution of nitrate of silver, in the course of a few moments it will become coated with reduced silver. Now charcoal, even after it has been strongly heated, is known to retain a portion of hydrogen, and I think it is not impossible that it may act in the case alluded to by Mr. Hunt in a manner analogous to the way in which it is known to act when it is purposely saturated with that gas.

I would also venture to remind you, that it cannot be considered certain that the blackened chloride of silver really does contain metallic silver. The circumstances under which the blackening takes place are such as would make me hesitate very considerably before I admitted such a conclusion. It is well known that the presence of free nitric acid in solution from which chloride of silver has been precipitated, though it retards greatly the action of light, yet does not prevent it. If you take a dilute solution of nitrate of silver in free nitric acid, and precipitate a quantity of chloride of silver from it, and expose it to the action of light, in the course of a few hours the surface will be coated with a violet compound, which I do not profess to name, plainly resulting from the action of light. Now this, be it observed, is in the presence of a powerful oxidizing agent, nitric acid, and hence it is highly improbable that this chloride of silver should contain metallic silver thus reduced; and therefore I should question the assertion that the black or violet compound is metallic silver.

Then with regard to the action of light upon albuminate of silver, supposing that this compound contains, as has been supposed by Mr. Hunt, metallic silver, why should it dissolve in potash, and produce the colored liquid which we have just seen? If it contained reduced silver, such a combination with potash would be impossible.

Mr. Malone.—Perhaps I may be allowed to make a few remarks upon the paper which has been read this evening, and also upon the discussion which has followed it, inasmuch as for some time I have taken the greatest possible interest in this question of positive printing; and I would beg to be permitted to say that it is peculiarly gratifying to me this evening to have heard Mr. Hardwich's paper, especially that part relating to the action of sulphur, because at a very early period I discovered that certain sulphuretting compounds were destructive to photographs. I dare say many present will remember that the statement was at first met with scepticism. We were told that the hyposulphite of soda caused the fading, and if we avoided this the pictures were safe. But from having treated pictures with sulphide of ammonium, and having ascertained that they pass through those stages of color which Mr. Hardwich has so clearly demonstrated in the experiments before us, I could not admit that simply washing free from hyposulphite of soda was sufficient. I suggested that we should keep our photographs free from sulphuretting vapors, and therefore I readily join with Mr. Hardwich in regretting that this fact, which I discovered and published, was not sooner received and acted upon, as we might have preserved many photographs which have been destroyed by the action of sulphuretting compounds. But there still remains much to be done with regard to the question of toning by sulphur. I have mentioned here before, that some prints made in 1844 were fixed with hyposulphite of soda. They had the usual characteristic disagreeable red color of the photographs of that time. They were then heated by passing a hot iron over the surface while damp, the picture still retaining a small amount of hyposulphite of soda. By this means a purplish tint was produced, which at the time I believed to be due to the action of sulphur, and yet those tints have not faded, although mounted in the ordinary manner, and exposed in a book in one of our London libraries. This I admit was an exceptional ease; but still it demands a full explanation as to how it happens that a print which has evidently been colored by the action of a sulphur compound, has, when placed in an ordinary library, remained permanent from the year 1844. Because if we can discover the conditions which attended the preparation and preservation of that print, it is quite clear that we may use sulphur as a toning agent. This is a point which I would recommend to Mr. Hardwich's attention, and perhaps presently he will be good enough to make some remarks upon it.

I may perhaps be allowed to make one or two further observations upon some points in the paper; and, first of all, with regard to the distinction drawn between pictures upon albumen and pictures upon collodion. Perhaps I misunderstood Mr. Hardwich, but I thought he said, a picture upon albumen, even when developed with gallic acid, does not present a metallic appearance; but that when developed upon collodion, we have an appearance of metallic silver. Do I understand it so?

Mr. Hardwich.—I made some observation of that kind, but I have a note to qualify it, if you will allow me to read it.

Mr. Malone.—Because I remember I pointed this out in the very first process ever given for the production of positive photographs upon glass—always excepting Sir John Herschel's early attempts—which experiments were given by me in the "Athenæum." The process was of this kind. An ordinary negative picture was made upon albumen developed by gallic acid, giving to the photographic image the characteristic black image obtained by Mons. Niepce. But by pouring a strong solution of nitrate of silver upon this photograph, I succeeded in converting the negative image into a positive image, and exactly resembling a daguerreotype. Part of the image now consisted of a white deposit, which upon rubbing became perfectly metallic; so it is evident we have two stages in the process as regards albumen. This fact should be borne in mind when we attempt to come to any conclusion upon the matter.

I may at once state, in the main I agree with Mr. Hardwich as regards the image being in all probability organic. Indeed, I think that experiments of my own, mentioned here, have tended to show it to be so. I added the white of an egg, and in other experiments milk, to nitrate of silver in common water, and produced the kind of image that Mr. Hardwich has alluded to; but when I omitted the organic matter I did not see the characteristic photographic color. At the time, it is true, I did not venture to give an opinion as to whether it was metallic silver or an oxide of silver conbined with organic matter. Mr. Hardwich's experiments have gone further into the matter, but still we require some additional and very decided experiments to be made before we can state the exact condition of the silver in the image, though I fully recognize the value of the many facts which Mr. Hardwich has ascertained respecting it.

With regard to the action of cyanide of potassium upon this red coloring matter which Mr. Hardwich has alluded to, I beg to say, that some years ago I made for Mr. Talbot some experiments with cyanide of potassium as a fixing agent, and I found that when sufficiently diluted it can be used, as it does not dissolve the coloring matter of the photograph upon paper, unless it is in a concentrated form. This should be borne in mind; for unless this qualification be added, we shall at once think cyanide of potassium cannot be used, whereas it is a fact that it *has* been used. Of course it is another question whether it is to be preferred. I make these remarks merely for the purpose of getting together all the facts we can, so that we may take as full a view of the whole matter as possible, and not have merely half the truth before us. I think it very desirable that experiments should still be carried on with sulphur as a toning agent. At present it is the fashion to use gold and entirely to discard sulphur; but I may perhaps be allowed to repeat, that pictures toned with sulphur are more transparent in the shadows than pictures toned with gold. Of course, as a matter of expense, sulphur would be preferable. The objection still remains, it is true, that sulphur pictures are more disposed to fade than others, but yet we have the strong fact before us, that a picture undoubtedly prepared with sulphur has remained in an ordinary library good since 1844. It is quite clear that sulphur does not necessarily cause the fading of such photographs, and therefore I think it very desirable that we should carry our experiments further in that direction.

With regard to the action of light upon chloride of silver, I was much pleased with Dr. Miller's remarks, and at his declining to give an opinion as to the exact composition of the darkened chloride of silver. Although we very often find it stated confidently that light simply liberates chlorine and leaves metal-

lic silver, yet certainly we have no proof that such is the case. The whole question of chloride of silver deserves a thorough examination. We have first of all ordinary chloride of silver, a white substance which with free nitrate of silver speedily darkens in the light. Then, again, we have a dark compound of silver and chlorine upon which M. Ed. Becquerel obtained the natural color, and which he calls violet chloride of silver. This he produced by immersing a silver plate in a perchloride, or by decomposing hydrochloric acid by a voltaic current, the silver plate forming the positive pole. It is not possible at prescut to ascertain its composition. It is not perhaps fair to call it a subchloride, taking that term in its ordinary sense to mean two combining proportions of silver to one of chlorine. Then, again, we have a third modification or form of chloride of silver which Dr. Percy brought under our notice, made by throwing silver leaf into chlorine, and which did not darken even in sunshine. No adhering chlorine could be said to be present.

Thus we see that we have chloride of silver which darkens in the light; chloride of silver which refuses to darken in the light; and chloride of silver which, when produced, is dark in color, but which whitens under the action of light. Finding we have all these forms of chloride of silver, it seems to me that we should have still further experiments in that direction with a view to reconcile these curious facts, and to point out their relations to photography. Meanwhile we should be as cautious as possible in coming to any positive conclusion upon the exact composition or decomposition occurring, or as to the nature of those chemical changes which takes place with regard to photographic substances under the action of light; otherwise we shall rest satisfied with a theory which appears to explain facts, and we may leave out many important points, and find our pictures still fade in spite of us. It is with this view simply that I have made these few remarks.

Professor Hunt.—If Mr. Malone will carry out the beautiful experiment of Scheele, or will read the account of what Scheele did in a tube, he will there find precise proof that an equivalent quantity of blackened powder was found after exposure to the light. I have again and again repeated the experiment, and have precipitated from the distilled water in which the chlorine has been blackened, an exact equivalent of chloride of silver representing the portion of chloride of silver remaining in the vessel. Nothing can be more simple than an experiment of this kind. Any gentleman in this room can with the greatest ease perform the experiment, upon which I am satisfied to rest the whole of what I have stated this evening, and on which I found my belief that the photographic image in nearly all cases is formed of metallic silver in a state of minute division.

With regard to iodide of silver, we have the same conditions. There have been a series of experiments by Dr. Draper, showing that when iodide of silver upon a daguerreotype plate undergoes decomposition, and forms the daguerreotype image, upon that plate may be poured gelatine and the image be stripped off. Then there is a film of iodide of silver remaining sensitive to the action of light. This may be repeated again and again. Here the iodine which is liberated does not escape from the plate, but attacks the under surface of the silver, and renders it sensitive at the same time that the decomposition is going on upon the upper surface. I have tried the same experiment with chloride of silver by exposing the silver plate to the action of chlorine, with the same result which Dr. Draper obtained with iodine. Therefore I think we have three different methods by which we have convincing proof, that after the blackness that is produced, whatever it may be, but which I think is metallic silver, an equivalent of chlorine is given off which may be again collected as chloride of silver, and examined by the scales in the ordinary way.

Mr. Malone.—I submit that the experiment as to the daguerreotype plate or the silver plate is not quite parallel. You are there acting upon iodide of silver in the presence of pure silver. There we might admit that the iodine, if liberated, attacks the free silver beneath, but in the chlorine experiment we have no free silver to take the first molecule of liberated chlorine; hence it decomposes the water. I do not see how this comparison proves the case.

Dr. Miller.—In these experiments which have been brought before us, I fear the action of ammonia upon the blackened chloride of silver has been overlooked. Assume that metallic silver were left in the residue from the action of ammonia upon the blackened chloride, it does not prove that because ammonia leaves metallic silver, metallic silver existed as metallic silver in the blackened compound. It merely proves that ammonia has produced a certain effect upon that compound, removing a quantity of chloride of silver.

Dr. Normandy.—I have not much time to dovote to the prosecution of experiments either in confirmation or disproof of the conclusion which Mr. Hardwich has come to, but I think he is entitled to great credit and the especial thanks of the Society for having called the attention of chemists to this very important fact.

It seems to me that there is no subject attended with greater difficulty than the determination of the composition of the photographic image. The difficulties are various, and of a peculiar character. I think that silver, nitrate of silver, and the salts of silver are attacked in a different manner by various compounds. Whilst one organic substance will scarcely produce any effect upon salts of silver, you will find that another organic compound will cause blackening. I was struck with the difference of action in investigating the patent of Mr. Talbot at the trial. I am prepared to say that if the process described then by Mr. Talbot of applying the solution to the paper by a camel's-hair brush be strictly followed, you will obtain a paper of a smudgy brown; but if you use a pledget of cotton-wool, the sensitive paper will be clear and good. I am of opinion, with Mr. Hunt, that the blackening of the image is due to metallic silver. I do not say it is not mixed with organic matter, but my opinion at present, so far as experiments have enabled me to form one, is, that it is altogether due to the reduction of metallic silver, and that the intensity of the blackness is caused by the greater or less state of division of the particles of silver. For although a particle may be so small as not to afford sufficient breadth to reflect light, and therefore it will appear black, still we may conceive in these infinitesimal particles degrees of fineness; that is, a particle which has not sufficient breadth to reflect light will appear black, and one half that size will appear blacker still. I am inclined to affirm this opinion from the fact, that if you pour proto-sulphate of iron on a solution of nitrate of silver, it is seldom that you will have that pure white precipitate which is described in books of chemistry. It is stated by Rose, for example, that proto-sulphate of iron will precipitate silver white. That is not quite correct: there will be a metallic coating in the glass tube if the experiment be performed in a glass-tube, but in other cases the precipitate will be of a drab color: you have no organic matter there, since you use only proto-sulphate of iron and nitrate of silver. If instead of proto-sulphate of iron you take pyrogallic acid, you obtain a precipitate which will pass through all degrees of darkness, and eventually you will obtain a black.

With respect to the action of light upon chloride of silver, I certainly think that the purple precipitate which is left behind after treatment with ammonia is metallic silver; still it may be true, as Dr. Miller asserts, that the ammonia has a decomposing action on the chloride of silver blackened by light.

Mr. Malone.—Assuming for a moment that this darkened chloride of silver is a subchloride, then, upon the addition of ammonia to such substance, we may take away an equivalent of chlorine combined with one of silver, and leave the second equivalent of silver as metallic silver, where metallic silver did not exist before, which will account for the action of nitric acid upon the residue after treatment with ammonia.

Dr. Normandy.—It is quite possible.

Prof. Hunt.—Allow me to ask—Is a subchloride of silver known to chemists upon which nitric acid will act, as we know it does act upon that dark powder forming the photographic image?

Mr. Malone.—It is known in Becquerel's experiments: he

takes a plate of silver, and places it where chlorine is being liberated. The chlorine seizes upon the silver, and the result is a black or dark substance. Becquerel found, upon treating that substance with hyposulphite, and the residue with ammonia, he got a white powder resembling metallic silver.

Prof. Hunt.—It appears to me most unfortunate that in the exact sciences we should allow the imagination to play so wild a part. We certainly do not know of the existence of such a subchloride of silver. We do know how nitric acid acts upon metallic silver; therefore when we have decided evidence that the darkened surface of the photographic image dissolves in nitric acid, why should we dart off at a tangent about a mere imaginary something of which we have not the slightest evidence?

Dr. Miller.—I was going to call Mr. Hunt's recollection to the existence of a subchloride of silver, which he rather denies. I have had an opportunity of making some. It is attacked by ammonia in precisely the same manner as this substance under discussion, leaving metallic silver, but it is not attacked by nitric acid. Subchloride of silver may be made by any person by acting upon silver leaf with perchloride of iron.

Prof. Hunt.—It is subchloride acted upon by nitric acid, which I referred to.

Mr. Malone.—The compound is not attacked by nitric acid.

Mr. Hardwich.—Does Mr. Hunt apply the nitric acid before or after the ammonia? because in trying the action of light upon chloride of silver, I obtained a blue substance which did not dissolve in nitric acid; but on washing the blue powder in ammonia, a quantity of chloride of silver was removed, and a white substance left, which was soluble in nitric acid. In a second experiment I treated a plate of silver with perchloride of iron. Here, again, I obtained a blue substance unacted upon by nitric acid, but soluble in nitric acid after immersion in ammonia. This led me to suppose that the ordinary action of light upon chloride of silver produces the same substance as is produced by perchloride of iron acting upon metallic silver. But in passing this through the fixing bath of ammonia or hyposulphite of soda, chloride of silver is dissolved, and metallic silver is left behind.

Mr. Malone's observation appears to be important. He understands me to say that a developed image upon albumen could not be metallic. The note attached to my paper, but which I omitted to read, will qualify that assertion. The length of time the light has acted makes a difference, and the deposit produced in the second part of the development is different from the red image of the first stage. My experiments do not lead me to trust too much to the mere color of the image. There may possibly be black metallic silver or red silver; and I agree with Dr. Normandy in thinking that the color of the deposit is not sufficient. But its properties are more to be depended on. The albumen compound reduced by light dissolves in boiling potash, giving it a red color. So also in the case of the citrate of silver: after exposure to the light you get a red substance nearly dissolved by ammonia, a portion only being left behind, which is intensely black in color. Perform a similar experiment with chloride of silver, and the powder left insoluble in ammonia will be white, and upon analysis will prove to be metallic silver. But this black substance when analysed gives more than 6 per cent. of organic matter and oxygen; so that it is plain there is a tendency in this reduced silver to retain carbonaceous matter.

I have an observation also to make upon Mr. Malone's remark as to the use of sulphur as a toning agent. Mr. Malone wishes us to continue toning by sulphur until some other plan be discovered. He quotes a case of a print toned by sulphur, which stood very well for ten years. Now that only appears to me to show how long we may keep a print which is really very unstable; for all my experiments have proved, that if a sulphuretted print be placed in damp air, in a few days or a few weeks it will pass into yellow in the half tones. Prints prepared in a different way stand well for three months under the same circumstances, and therefore how much longer might they be expected to last than Mr. Malone's prints, which probably would soon have faded if they had not been kept dry. Sulphuretted prints will remain good in dry air, but they will fade when exposed to damp.

Mr. Malone.—It has always been a great point with me to recommend that photographs should be kept dry,—not hung up in fact, but bound up in a book, like the "Pencil of Nature" of Mr. Fox Talbot. I believe, if kept dry, that they can be preserved. I have no objection to the use of gold as a toning agent, if it could be shown to give a better result, and at the same time give greater permanence; but I wish that sulphur should not be thrown overboard until it has been fully and fairly tried. As the atmosphere contains traces of a sulphuretting compound, the fading of photographs, however toned, is only a question of time and degree. Both gold and sulphuretted prints will eventually fade.

DUMFRIES AND GALLOWAY PHOTOGRAPHIC SOCIETY.

The Monthly Meeting of this Society was held on Tuesday, July 8th, when there was a good attendance. P. Dudgeon, Esq., President occupied the chair. The subjects before the meeting were two interesting papers, one "On various Appliances of photography," the other "On the Albumen Process."

Mr. Rimmer, the writer of the first of these, urged on the members the importance of not all confining themselves to one branch of the art, but extending the field of their researches as widely as possible. That they should divide themselves into sections (so to speak), each of which should have for its aim the dilgent investigation of a seperate process,—not to the entire exclusion of others, but keeping the one selected mainly in view. The science of photography was every day adapting itself so wonderfully to the other arts, that it would be difficult to enumerate the various uses to which it may be made subsevient; for the present it would suffice to name one or two of which the members might avail themselves. The application of the art to microscopic delineation was a most important one. What fields of wonder did it not display to the lover of Nature, unfolding what might be termed her hitherto hidden beauties; beginning as it were, where the wearied pencil of the artist flags, and portraying scenes which no art has fixed before! A striking feature in photography was, that it had, in a remarkable degree, contributed not only to the simplification, but also to the economy of arts which had hitherto been carried out at an immense expense,—as, for instance, the art of the engraver. By means of photography, impressions are produced on metal, stone, and wood, which are only second to nature in beauty and faithfulness of detail. Photography not only lent her aid to the philosopher, but also to the bagman, for he was enabled by it means to display the beautics and novelties of his trade without the ponderous encumberance of bagage which was formerly entailed upon him. He would only further add, that he trusted the members of the Society would regard this science not merely as an amusement, but as a most important and efficient means by which the other arts and sciences may be improved; and that, while they admitted the respective merits of each of the many processes which it embraces, they would endeavor, as a body, to combine the whole.

The next paper read was that of Mr. Taylor "On the Albumen process." If there was infallibility in any photographic process, he claimed it for the one now under notice, describing it as being the most accommodating process he knew of, and one which, in the hands of an ordinarily skilful operator, was capable of producing first-rate results. Among the many advantages it possessed over other processes was first its cheapness, especially for large pictures. Compared with collodion, its cost was as one to nine. Albumen was easily procured, for one could find fresh eggs in abundance everywhere; and from these were procured the albumen for photographic purposes. Secondly, it was entirely free from the annoyances attendant on operations with collodion, with which even the best operators often failed; whereas a failure in this process was the exception, not the rule; he quoted the language of Mayall of London, "that with 100 albuminized plates he has taken 100 first-rate negatives." To the peripatetic photographer also it was far superior to any other process, for plates carefully prepared could be kept

for upwards of a month ready for instant use,—in this respect superior to collodionized plates, which only kept half an hour; or calotype paper, which kept only a day or two. With regard to its keeping qualities, it had only one rival—waxed paper; but over which, he thought, the albuminized plates possessed some advantages. He was aware of a gentleman who had a number of plates prepared ready for use in England, and who went over to the Continent and exposed them, and on his return to London had them developed. By no other process could this have been done. By this process were taken most of the fine stereoscopic views now so common, and by this process also were produced the *chef-d'œuvres* of Messrs. Ross and Thompson, Edinburgh, which gained them the Council Medal at the Great Exhibition. Owing to the recent improvements introduced in it by Taupenot, of France, he had no doubt that in a year or two it would be much more extensively used than at present. He then entered at great length on the practical details, recounting the various modifications used in France, Britain, and America, with notes on the advantages attendant on each. In conclusion, he stated that the finest and largest pictures he had seen, and those having the distances most true to nature, were taken by the albumen process.

The thanks of the Meeting were recorded to the authors of the two papers.

Upwards of 100 photographs were exhibited at the meeting, all of them, with one or two exceptions, being the production of the members. Those of Mr. Dudgeon were very much admired for their artistic character and fine tone, his delineations of local scenery being confessedly the best ever exhibited in Dumfries.

At the close of the meeting three new members were admitted.

[The above Society was formed two months ago, and already consists of about two dozen members. President, Patrick Dudgeon, Esq., of Cargen; Vice-President, Richard Rimmer, Esq., of Marchmount; Honorary Secretary and Treasuer, Mr. J. Traill Taylor, Dumfries.]

NATURAL IMPRESSION.

LA FLORE IL AUTRICHE.*

M. Auer, conseiller de regence, director of the Impriemerie Imperial de Vienna and member of the academy, has remitted to the President of the Academy of the Sciences, a copy of the *Flore Antrichienne*, executed by the process of *original* or *natural impression* by Messrs. Dr. C. D'Ettingshausen and Alois Pokorny.

The *Flore Antrichienne* offered the Academy, is composed of one quarto volume, and five folio Atlasses of 500 plates. "This work," says M. Auer, "is the first produced by the process of natural impression, a process invented by the Imprimerie Imperiale of Vienna. This establishment would attach high value to any opinion which may be given by so learned a society as the Academy, regarding the advantages which this method may present in a scientific point of view, and I take the liberty to beg you to appoint a committee to examine from the specimen of the *Flore Antrichienne* we herewith send, into the application of the process to publications on natural history."

According to the desire expressed by M. Auer, the work was handed over to the following committee: Messrs. Pouillet, Decaisne and Payer. The discovery of natural impression was made by the director of the Impriemerie Imperiale, M. Louis Auer, aided by one of his assistants, André Woring. This beautiful invention dates back from the 12th October 1852, as is shown by reference to the patent from the Austrian government, taken out in the name of M. Woring, Mr. Auer not desiring to interfere with the name of the establishment. The inventor was not guided by any interested view; by taking an exclusive patent, he had no other intention than to assume the priority of the invention, and notwithstanding the large offers that were made him to buy his right, he solicited and obtained, on the 29th of April, 1853, the following decision from S.M. l'Empereur—that, in view of the progressive development of the Arts and Trades, and in view also of the general utility and importance thereof, the invention of natural impression should be *handed over freely to the public.*

Natural impression furnishes the means to produce in the simplest and most rapid manner printing forms, from the original itself, for entire collections of plants, for stuffs, laces, embroideries, and all kinds of objects in general whether original or copied; however slight their relief or cavity. By this new method we may either draft our prints in white, in a colored ground, or obtain in the natural colors on white paper perfect copies of the original without recourse to any drawing, or any labor from the hand of man. For this reason it has been called. "Natursellst Druk," Printing by Nature itself.

We gave last year the process marked out by M. Auer to copy lace; the following is the inventor's solution of the problem for the reproduction of objects of divers natures:

Problem.—How can a plate, ready for the printing press, be obtained in a few seconds from any object, of which the resemblance shall be perfect, the cost slight, and rendering useless the aid of the draughtsman or engraver?

Solution.—By placing the original, whether a plant, a flower, an insect, a stuff, or a tissue, between a plate of copper and a plate of lead, and thrusting them between two strong pressure cylinders. (The pressure varies from 8000 to 10,000 lbs).

From this pressure, the original leaves the print of the object with all the shades of its tissue, and so to speak, all its surfaces upon the lead plate.

If colors be applied to this lead printing plate, as in copper plate engraving, copies may be obtained by pressure so closely resembling the original as to be mistaken for it, and in the most varied colors.

If a large number of prints are to be drafted, which could not be taken from the lead owing to its softness, it should be stereotyped or galvanized, and the cast used instead of the lead.

In the case of objects which may be damaged thereby, the original should be coated with a solution of gutta percha, and after having coated the latter with a silver solution, the gutta percha cast may be used in a matrix for galvanic reproduction, or otherwise, the galvanic current may be thrown on the object previously galvanized.

As we remarked above, this new and ingenious process of reproduction is the property of all; amateurs, artists, tradesmen, every one may by following the directions of Mr. Auer, copy the finest fibres of a stuff, or the most delicate parts of a plant or flower, seize on details the most imperceptible to the naked eye, and, thanks to the liberal abnegation of the inventor, to make use of the fruits of this discovery as he may please.

At the *Exposition Universalle* of 1855, in department No. 6, reserved by the Impriemerie Imperiale of Vienna, for specimens of original and natural impression, five hundred and seventy-five specimens were exhibited, representing agate stones engraved with nitric acid by Professor Leydold—petrified fish from specimens from the Imperial Conservatory, J. Heckel—with lace on blue ground, and gold lace on white ground in relief—mosses from the valley of Arpasch in Transylvania—stuffs and woven work—insects, etc., etc., and lastly five hundred plates representing the Flore d' Autriche.

The five folio Atlasses presented to the Academy, contain some of the most beautiful specimens of this colossal work, and are accompanied by a splendid volume of explanatory text.

Such prodigious results obtained in the space of scarcely three years since the discovery of M. Auer, who has already made a great reputation in numerous works relating to topography, sufficiently prove that the director of the Imperiale Impriemerie, not only as a distinguished savant, but an administrator of rare merit, has been able to give so skilful a direction to the powerful agencies of which he disposes, that the success met with has surpassed all expectations.

On viewing the colored plates sent the Academy, it seems evi-

* The Botany of Austria.

dent that the new process of natural impression, joining the advantages of easy and rapid practice, of giving science numerous copies at a low price, incoutestable truthfulness, is superior to all those previously obtained by the methods in use.

The Report which will be made by the members of the Committee appointed by the Academy of Sciences of Paris, will evidence their opinion as to the various advantages of this process, and will decide whether it's application in France to publications concerning natural history, would be opportune.

In the rich collections of the Museums, there are a considerable number of specimens which might be copied by natural impression, in their true colors, without changing any essential character; these platcs would represent and in case of need take the place of originals difficult to preserve from the attacks of time. This uew process would be called, therefore, to render as important services to botany as it has to zoology, by the work undertaken under the title of *Iconographic Photography*, and continued with success by M. Rousseau, the skilful photographer of the Muscum. A. T. L.

From the Journal of the Phot. Soc.

ON THE DRY COLLODION PROCESS.

BY DR. NORRIS.

To the Editor of the Photographic Journal:

Sir,—With your permission I will detail a few experiments which have occupied my attention for some considerable time. In the month of April last year, I sent a communication to the Photographic Journal on the subject of dry collodion. Since that time I have made much advance in that peculiar direction, but have until now refraiued from publishing on account of the apathy which I imagiued existed upon the subject. The publicatiou of the process of M. Taupenot seems to have given fresh impetus to this branch of photography. The hue and cry raised against collodion by some persous is evidently the result of too little familiarity with its actual capabilities, and I generally find that the arguments against it have refereuce to its apparant rather than real difficulties.

The process removes from collodiou the reproach of requiring vans, huts, waggons, tents, washing baths, and a host of other cumbrous paraphernalia. All that is nccessary on an excursion is the camera, stand, and plate-box, the latter occupying very little space, as the plates lie in direct contact upon each other. Mr. Sutton, speakiug of collodion negatives, says they are full of inaccuracics, defects, &c., which cannot be remedied, because collodion cannot be prepared free from extraneous matters, as floating cotton, &c. Now to obviate this, let the collodion, or rather the solution of pyroxyline in ether, be made very thin, and filtered through an apparatus similar to that used for pure potash, and when clear it may be thickened by distilling off a portion of thc ether. The alcohol and iodide may be afterwards added. In my opinion, it is quite possible to prepare collodion eutirely free from foreign matters; aud this accomplished, I have no hesitation in saying that the dry collodion will ultimately rival albnmen in thc delicacy of its results, and nothing will prevent it from taking the precedence, considering its easy manipulation and superior sensitiveness. In regard to M. Taupenot's process, its chief defcct is that of being a *double process*, both in regard to time, troublc, and expcuse; but as the cause of the increased sensitivencss of the albumen is, in my opinion, merely the result of being placed upou an absorbeut layer or stratum, no doubt it will soon be considcrably modified.

Thc difficulties which besct the dry collodion are entirely mechanical, aud arise from the impervious nature of the film when ouce dry and contracted. This may be satisfactorily proved by immersing a strip of paper, coated on both sides, in water; the paper will be fouud stiff and crimp after hours of immersion, demonstratiug that the capillary character of the collodion has been destroyed. Now, as in the preparation of a collodion plate the iodide of silver is deposited, not on the surface, but in the substance of the film, we could not hope to establish a dry collodion process unless the capillary character of the film would admit of restoration so as to allow the penetration of the gallic acid and nitrate of silver solutions. After numerous experiments, many of which were directed towards resoftening the film by substances having a partially solvent action upon it, I have arrived at this conclusion, that in order to prepare a collodion plate in such a condition, that after desiccation it can be restored to a penetrable pappy state, it is necessary to float over it while still wet some substance soluble in watcr, or at least penetrable by water, so that its capillaries or pores being filled with this substance, the gallic acid and silver solution used in developiug may readily penetrate to the particles of iodide of silver acted upon by light. Now for this purpose many substances may be employed, bnt albumen and gelatine have been most successful in my hands. Preferring the latter, I take a piece of pure trausparant gelatine, and breaking it into bits, fill a 4-oz. bottle one quarter full; I then fill up with distilled water, aud dissolve by the fire; when thoroughly dissolved, I filter while hot through ordinary filtering paper, and then sct aside to gelatinize. As regards the collodion, it does not seem to matter whether it is new or old, as the object is merely to producc a beautifully even layer of iodide of silver with a collodion giving a pappy soft film easily receiving the impression of the finger, in contradistinction to one of a very firm contractile natue: thc after-development is far more rapid, being completed in from ten minutes to a quarter of an hour, instead of, as with the latter collodion, an hour or two. The silver bath may be a 40-gr. solution, saturated with iodide of silver and slightly acidified with acetic acid. Proceed then in the ordinary way to coat and excite the plate, then wash thoroughly from it all free nitrate of silver. This must be very carefully done. Having liqucfied the gelatine, but not made it hot, pour it over the plate, which has been drained for a few seconds; let it remain on about half a minute, thcn drain and dry either spoutaneonsly or on a steam apparatus. The plate is then ready for exposure, or may be set aside in a plate-box till required: a great number of plates may be prepared in an hour. As regards their keeping qualities, I bclieve they will keep any length of timc unless the pyroxyliue undergoes decompositiou. To my knowledge they will not be inferior in a fortnight, and the probability is they would keep much longer, the iodide of silver being protected by a varnish of gelatine; the sensitiveness varies much with different specimens of collodion; with the full aperture of a Lerebour's half-plate lens of 9 inches focus and a sunlit view, three seconds would be sufficient. I develope by immersing the plate in a solution of gallic acid for a minute, and then place it upon the stand, and pour over it a mixture of equal parts of saturated solution of gallic acid and 2 per cent. nitrate of silver solution. If the picture is not over exposed, it will acquire any degree of intensity the operator may desire. In case albumen is used instead of glatine, it must be whipped up in the usual manner with au equal bulk of water, and after exposurc must be coagulated by immersing in a bath of nitratc of silver. Trusting that I have becn sufficiently lucid in my explanations,

I beg to remain,

Yours obediently,

Hill Norris, M. D.

Should any gentleman desire to correspond with me upon the matter, my address is "46. Stafford Street, Birmingham."

Rouge.—Under this name the sesquioxide of iron is sold for polishing purposes to the daguerrean artist. It is prepared by precipitation, and calcination. The best jeweller's rouge is prepared by calcining the precipitated oxide until it becomes scarlet. The sesquioxide of irou, prepared by precipitation, is an impalpable powder, of a brownish red color. Rouge for daguerreotype purposes should be tasteless, and without a sense of grit when rubbed between the fingers or on the tongue. It is generally used separately, but a slight mixture of plumbago improves it.

From the Cosmos for April 17th.

IMPROVEMENT ON M. Taupenot's Process with Albumenized Collodion.

BY M JULIEN BLOT.

One great inconvenience in M. Taupenot's process has been a granulated blistering of the albumenized collodion film at the time of the last sensitizing. The inventor himself foresaw this, and had shown how to guard against it; but M. Blot found that by following out his directions, he only succeeded in keeping the sensitized film fixed by sacrificing much of the softness of the image.

He has therefore for some time sought another more efficacious means of attaining the same end; and he has at least succeeded, according to his own statement, in modifying M. Taupenot's process so as perfectly to avoid this inconvenience, and to obtain a greater sensibility with a much less time of exposure. We give his method in his own words:—

I use different collodions indiscriminately: the date of their iodizing is of no consequence. But with a collodion thicker than M. Taupenot, I think, has made, it is necessary to give it a fluidity great in proportion to the size of the plate.

Into a china dish I pour 60 grammes (about 2 fluid ounces) of rain water, in which I dissolve on the fire 12 grammes (about 5 drachms) of red dextrine and 1 gramme 2 decigrammes (about 18½ grains) of iodide of potassium: after this double solution has cooled, I pour off this liquid into another vessel, in which I have previously put the whites of two eggs; the whole filling about 70 cubic centimentres (2½ fluid ounces, nearly). I beat up the whole to a thick white froth, and leave the albumen to drain protected from dust. This albumen I spread on the collodion film, after having washed it when taken out of the silver bath. I put the collodionized glass horizontally on a copper fork, the prongs of which are bent in such a way that only the ends of the glass are supported. I pour on the part of the glass nearest to my left hand which holds the fork, a sufficient quantity of the albumen above mentioned, to cover all the upper part of the collodion film; I slant the glass to the left, then to the right, in order to cover with albumen all the collodionized surface, and I throw the excess of albumen to the two opposite corners, by giving to the glass a position nearly vertical. I leave the glass to drain a few moments, after which I dry it by moving a spirit-lamp about under the glass, beginning at the upper part. I take care, in order to give an equal thickness to the sensitized film, to drain off the albumen by the opposite corner to that by which I drained off the collodion: this means I have found perfectly successful. When the albumenized film is dry, I continue to move the spirit lamp about under the glass as long as it took to dry it completely, or even longer if needful.

This is an infallible means of preventing the blisters, and one which allows the use of a collodion of a reasonable thickness. I should say, that the part of dextrine in this method of preparation is to permit the baking of the albumen without altering at all its iconographic properties; and that it gives the possibility of restoring the albumen film, if cracked by the heat, to its normal condition by cooling or by breathing over it. The glass being cooled, I sensitize it lastly in the bath of aceto-nitrate of silver; I wash it and dry it at the spirit-lamp, which allows me to remove it immediately without fearing the effects of dust on the sensitized film. This is another important property of the dextrine. The glass thus prepared gives impressions which differ in no respect from images obtained on silver collodion; and more, it keeps sensitive, without alteration, for eight days in winter. The method of drying above mentioned cannot be applied to the use of albumen fermented with honey.

[Next month an article descriptive of Dr. Taupenot's process will appear, from the pen of a distinguished member of the French Photographic Society. Unavoidable pressure of matter compels the postponent of its immediate publication.—Ed. P. J.]

THE COLLODION KNAPSACK.

To the Editor of the Photographic Journal:

Sir,—Amidst the struggles for supremacy of the albumen, dry collodion, and waxed-paper processes, you will perhaps be glad to hear that the wet collodion process has not been entirely abandoned. The advantages of this process for landscapes need scarcely be urged. The great desideratum in taking pictures by any method is to be able to develope them on the spot. Who likes to walk half-a-dozen miles across a mountain to some picturesque scene, and return home only to find that he must go again to-morrow? The rapid action too of wet collodion is quite indispensable when groups of figures, cattle, or any moving objects form part of the picture.

To say a word in praise of its delicacy of tone and perfection of artistic effect would be superfluous. Its beauty in these matters is fully proved by the numerous examples in this year's Photographic Exhibition.

The weight of the tent, chemicals, bottles, lens, camera, &c. &c., has I believe, been the principle obstacle to out-of-door collodion work, and none of the inventions for the purpose seem to have been quite successful. I have therefore, during the last twelve months, been experimenting in the country with various models, and have at length succeeded in constructing a knapsack-camera, which has all the properties a photographer can desire. It is light, has great simplicity of form, and affords easy and rapid manipulation. The model which I am using at preasent weighs, when all the bottles are filled, from 15 to 20 lbs. , it contains a plate-box and eight plates, nitrate-bath, lens, water, and everything necessary, even to the drying and varnishing of the negative; the size of the plates in the model above mentioned is 7×5½ in., but with a small increase of weight, plates 9×7 may be easily taken. The unpacking of the knapsack and chemicals occupies from five to ten minutes. The apparatus answers the fourfold purpose of packing-case, camera, dark chamber, and tray for holding the chemicals; and the parts are so arranged that, when the operator fixes on several subjects in one locality, he can carry the camera and stand in one hand, and the chemicals in the other, without the trouble of repacking. A stereoscopic slide may be easily added, and a lens of any focus may be used.

In a short time I shall be happy to bring the invention before the Photographic Society, or to show it to any photographer who may like to call at 78, Newgate Street, for the purpose.

I am, Sir, Your obedient Servant,

Charles W. Quin.

HINTS ON FOGGING.

To the Editor of the Photographic Journal:

Sir,—Having been for a long time past annoyed with the fogging of collodion pictures (especially when using sulphate of iron as a developer), after trying numberless formulæ without finding a remedy, I at last hit on a preventive, which I am happy to place at the service of those of your readers who may be troubled from the same thing.

I find the principal cause to be in allowing the plate to remain in the bath after it has become saturated, and not lifting it therefrom once every twenty-five seconds, or oftener, after the first twenty-five seconds.

Another cause is from the developer either being too strong or containing too much acid. The following will be found to give most perfect pictures, and if applied with any degree of care will not stain the plate:—

Sulphate of Iron................	80 grs.
Acetic acid......................	1½ dr.
Water (*rain*)..................	8 oz.

Should I not have been sufficiently explicit, I shall feel pleasure in answering any correspondent.

I am, Sir, Yours respectfully,

John Titterton.

THE STEREOSCOPE
Its History, Theory, and Construction.

BY SIR DAVID BREWSTER.

INTRODUCTION.

THE *Sterescope*, a word derived from στερεος, *solid*, and σκόπειν, to *see*, is an optical instrument, of modern invention, for representing, in apparent relief and solidity, all natural objects and all groups or combinations of objects, by uniting into one image two plane representations of those objects or groups as seen by each eye separately. In its most general form the Stereoscope is a *binocular* instrument, that is, is applied to *both* eyes; but in two of its forms it is *monocular*, or applied only to *one* eye, though the use of the other eye, without any instrumental aid, is necessary in the combination of the two plane pictures, or of one plane picture and its reflected image. The Stereoscope, therefore, cannot, like the telescope and microscope, be used by persons who have lost the use of one eye, and its remarkable effects cannot be properly appreciated by those whose eyes are not equally good.

When the artist represents living objects, or groups of them, and delineates buildings or landscapes, or when he copies from statues or models, he produces apparent solidity, and difference of distance from the eye, by light and shade, by the diminished size of known objects as regulated by the principles of geometrical perspective, and by those variations in distinctness and color which constitute what has been called aerial perspective. But when all these appliances have been used in the most skilful manner, and art has exhausted its powers, we seldom, if ever, mistake the plane picture for the solid which it represents. The two eyes scan its surface, and by their distance-giving power indicate to the observer that every point of the picture is nearly at the same distance from his eye. But if the observer closes one eye, and thus deprives himself of the power of determining differences of distance by the convergency of the optical axes, the relief of the picture is increased. When the pictures are truthful photographs, in which the variations of light and shade are perfectly represented, a very considerable degree of relief and solidity is thus obtained; and when we have practised for a while this species of monocular vision, the drawing, whether it be of a statue, a living figure, or a building, will appear to rise in its different parts from the canvas, though only to a limited extent.

In these observations we refer chiefly to ordinary drawings held in the hand, or to portraits and landscapes hung in rooms and galleries, where the proximity of the observer, and lights from various directions, reveal the surface of the paper or the canvas; for in panoramic and dioramic representations, where the light, concealed from the observer, is introduced in an oblique direction, and where the distance of the picture is such that the convergency of the optic axes loses much of its distance giving power, the illusion is very perfect, especially when aided by correct geometrical and aerial perspective. But when the panorama is illuminated by light from various directions, and the slightest motion imparted to the canvas, its surface becomes distinctively visible, and the illusion instantly disappears.

The effects of stereoscopic representation are of a very different kind, and are produced by a very different cause. The singular relief which it imparts is independent of light and shade, and of geometrical as well as of aerial perspective. These important accessories, so necessary in the visual perception of the drawings *in plano*, avail nothing in the evolution of their *relievo*, or third dimension. They add, doubtless, to the beauty of the binocular pictures; but the stereoscopic creation is due solely to the superposition of the two plane pictures by the optical aparatus employed, and to the distinct and instantaneous perception of distance by the convergency of the optic axes upon the similar points of the two pictures which the stereoscope has united.

If we close one eye while looking at photographic pictures in the stereoscope, the perception of relief is still considerable, and approximates to the binocular representation; but when the pictures are mere diagrams consisting of white lines upon a black ground, or black lines upon a white ground, the relief is instantly lost by the shutting of the eye, and it is only with such binocular pictures that we see the true power of the stereoscope.

As an amusing and useful instrument the stereoscope derives much of its value from photography. The most skilful artist would have been incapable of delineating two equal representations of a figure or a landscape as seen by two eyes, or as viewed from two different points of sight; but the binocular camera, when rightly constructed, enables us to produce and to multiply photographically the pictures which we require, with all the perfection of that interesting art. With this instrument, indeed, even before the invention of the Daguerreotype and the Talbotype, we might have exhibited temporarily upon ground glass, or suspended in the air, the most perfect stereoscopic creations, by placing a Stereoscope behind the two dissimilar pictures formed by the camera.

CHAPTER I.

HISTORY OF THE STEREOSCOPE.

WHEN we look with both eyes open at a sphere, or any other solid object, we see it by uniting into one two pictures, one as seen by the right, and the other as seen by the left eye. If we hold up a thin book perpendicularly, and midway between both eyes, we see distinctly the back of it and both sides with the eyes open. When we shut the right eye we see with the left eye the back of the book and the left side of it, and when we shut the left eye we see with the right eye the back of it and the right side. The picture of the book, therefore, which we see with both eyes, consists of *two* dissimilar pictures united, namely, a picture of the back and left side of the book as seen by the left eye, and a picture of the back and right side of the book as seen by the right eye.

In this experiment with the book, and in all cases where the object is near the eye, we not only see *different pictures* of the same object, but we see *different things* with each eye. Those who wear spectacles see only the left hand spectacle-glass with the left eye, on the left side of the face, while with the right eye they see only the right-hand spectacle-glass on the right side of the face, both glasses of the spectacles being seen united midway between the eyes, or above the nose, when both eyes are open. It is, therefore, a fact well known to every person of common sagacity that *the pictures of bodies seen by both eyes are formed by the union of two dissimilar pictures formed by each.*

This palpable truth was known and published by ancient mathematicians. Euclid knew it more than two thousand years ago, as may be seen in the 26th, 27th, and 28th theorems of his Treatise on Optics.* In these theorems he shows that the part of a sphere seen by both eyes, and having its diameter equal to, or greater or less than a hemisphere; and having previously shewn in the 23d and 24th theorems how to find the part of any sphere that is seen by one eye at different distances, it follows, from constructing his figure, that each eye sees different portions of the sphere, and that it is seen by both eyes by the union of these two dissimilar pictures.

More than *fifteen hundred* years ago, the celebrated physician Galen treated the subject of binocular vision more fully than Euclid. In the *twelfth* chapter of the tenth book of his work, *On the use of the different parts of the Human Body*, he has described with great minuteness the various phemomena which are seen when we look at bodies with both eyes, and alternately with the right and the left. He shews, by diagrams, that dissimilar pictures of a body are seen in each of these three modes of viewing it; and after finishing his demonstration, he adds,—

"But if any person does not understand these demonstrations by means of lines, he will finally give his assent to them when he has made the following experiment:—Standing near a column, and shutting each of the eyes in succession;—when the *right* eye is shut, some of those parts of the column which were

* Edit. of Pena, pp. 17, 18, Paris, 1577: or *Opera*, by Gregory, pp. 619, 620.Oxon. 1703.

previously seen by the *right* eye on the *right* side of the column, will not now be seen by the *left* eye; and when the *left* eye is shut some of those parts which were formerly seen by the *left* eye on the *left* side of the column, will not now be seen by the *right* eye. But when we, at the same time, open both eyes, both these will be seen, for a greater part is concealed when we look with either of the two eyes, than when we look with both at the same time."*

In such distinct and unambiguous terms, intelligible to the meanest capacity, does this illustrious writer announce the fundamental law of binocular vision—the grand principle of the Stereoscope, namely, *the picture of the solid column which we see with both eyes is composed of two dissimilar pictures, as seen by each eye separately*. As the vision of the solid column, therefore, was obtained by the union of these dissimilar pictures, an instrument only was wanted to take such pictures, and another to combine them. The Binocular Photographic Camera was the one instrument, and the Stereoscope the other.

The subject of binocular vision was studied by various optical writers who have flourished since the time of Galen. Baptista Porta, one of the most eminent of them, repeats, in his work *On Refraction*, the propositions of Euclid on the vision of a sphere with one and both eyes, and he cites from Galen the very passage which we have given above on the the dissimilarity of the three pictures seen by each eye and by both. Believing that we see only with one eye at a time, he denies the accuracy of Euclid's theorems, and while he admits the correctness of the observations of Galen, he endeavors to explain them upon other principles.

In illustrating the views of Galen on the dissimilarity of the pictures which are requisite in binocular vision, he employs a much more distinct diagram than that which is given by the Greek physician. "Let A," he says, "be the pupil of the right

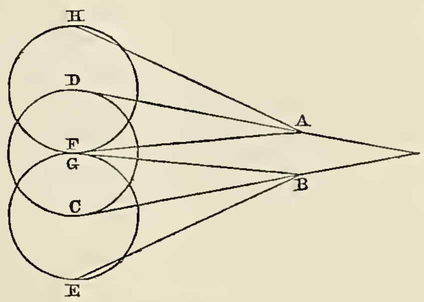

Fig. 1.

eye, B that of the left and DC the body to be seen. When we look at the object with both eyes we see DC, while with the left eye we see EF, and with the right eye GH. But if it is seen with one eye, it will be seen otherwise, for when the left eye B is shut, the body CD, on the left side, will be seen in HG, but when the right eye is shut, the body ED will be seen in FE, whereas, when both eyes are opened at the same time, it will be seen in CD." These results are then explained by copying the passage from Galen, in which he supposes the observer to repeat these experiments when he is looking at a solid column.

In looking at this diagram, we recognise at once not only the principle, but the construction of the stereoscope. The double stereoscopic picture or slide is represented by HE; the right hand picture, or the one seen by the right eye, by HF; the left-hand picture, or the one seen by the left eye, by GE; and the picture of the solid column in full relief by DC, as produced midway between the other two dissimilar pictures, HF and GE, by their union, precisely as in the stereoscope.†

Galen, therefore, and the Neapolitan philosopher, who has employed a more distinct diagram, certainly knew and adopted the fundamental principal of the stereoscope; and nothing more was required, for producing pictures in full relief, than a simple instrument for uniting HF and GE, the right and left hand dissimilar pictures of the column.

In the treatise on painting which he left behind him in MS.,‡ Leonardo da Vinci has made a distinct reference to the dissimilarity of the pictures seen by each eye as the reason why "a painting, though conducted with the greatest art, and finished to the last perfection, both with regard to its contours, its lights, its shadows, and its colors, can never shew a *relievo* equal to that of the natural objects, unless these be viewed at a distance and with a single eye."§ which he thus demonstrates. "If an object C be viewed by a single eye at A, all ob-

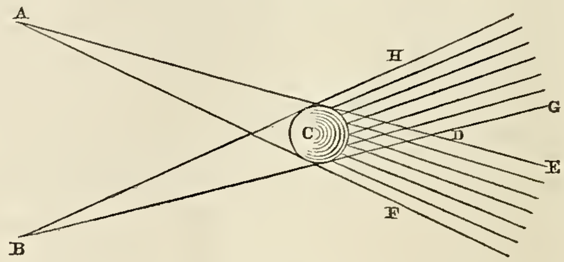

Fig. 2.

jects in the space behind it—included, as it were, in a shadow EEF, cast by a candle at A —are invisible to an eye at A; but when the other eye at B is opened, part of these objects become visible to it; those only being hid from both eyes that are included, as it were, in the double shadow CD, cast by two lights at A and B and terminated in D; the angular space EDG, beyond D, being always visible to both eyes, And the hidden space ED is so much the shorter as the object C is smaller and nearer to the eyes. Thus he observes that the object C, seen with both eyes, becomes as it were, transparent, according to the usual definition of a transparent thing, namely, that which hides nothing beyond it. But this cannot happen when an object, whose breadth is bigger than that of the pupil, is viewed by a single eye. The truth of this observation is, therefore, evident, because a painted figure intercepts all the space behind its apparent place, so as to preclude the eyes from the sight of every part of the imaginary ground behind it. Hence," continues Dr. Smith, "we have one help to distinguish the place of a near object more accurately *with both eyes than with one*, insomuch as we see it more detached from other objects beyond it, *and more of its own surface, especially if it be roundish*."

We have quoted this passage, not from its *proving* that Leonardo da Vinci was acquainted with the fact that each eye, A, B, sees dissimilar pictures of the sphere c, but because it has been referred to by Mr. Wheatstone as the only remark on the subject of binocular vision which he could find "after looking over the works of many authors who might be expected to have made them." We think it quite clear, however, that the Italian artist knew as well as his commentator Dr. Smith, that each eye, A and B, sees dissimilar parts of the sphere C. It was not his purpose to treat of the binocular pictures of c, but his figure proves their dissimilarity.

The subject of binocular vision was successfully studied by Francis Aguillon or Aguillonius,|| a learned Jesuit, who published his optics in 1613. In the first book of his work, where he is treating of the vision of solids of all forms, *(de genere illorum quæ τὰ στέρεα, (ta sterea) nuncupantur,)* he has some difficulty in explaining, and fails to do it, why the two dissimilar pictures of a solid, seen by each eye; do not, when united, give a confused and imperfect view of it. This discussion is appended to the demonstration of the theorem, "that when an object is seen with two eyes, two optical pyramids are formed whose common base is the object itself, and whose vertices are in the eyes."¶ and is as follows:—

* *De Usu Partium Corporis Humani*, edit. Lugduni, 1550, p. 593.

† Joan Baptistæ Portæ Neap, *De Refractione Optices parte*, lib. v. p. 132, and lib. vi. pp. 143-5. Neap. 1593.

‡ *Trattata della Pictura, Scultura, ed Architettura.* Milan, 1584.

§ Dr. Smith's *Compleat System of Opticks*, Vol. ii., Remarks, pp. 41 and 244.

|| *Opticorum Libri Sex Philosophis juxta ac Mathematicis utiles.* Folio. Antverpiæ, 1513.

¶ In FIG. 1, AHF is the optical pyramid seen by the eye A, and BGE the optic pyramid seen by the eye B.

When one object is seen with two eyes, the angles at the verticles of the optical pyramids (namely, HAF, GBE, Fig. 1) are not always equal, for beside the direct view in which the pyramids ought to be equal, into whatever direction both eyes are turned, they receive pictures of the object under inequal angles, the greatest of which is that which is terminated at the nearer eye, and the lesser that which regards the remoter eye. This, I think is perfectly evident; but I consider it as worthy of admiration, how it happens that bodies seen by both eyes are not all confused and shapeless, though we view them by the optical axes fixed on the bodies, themselves. For greater bodies, seen under greater angles appear lesser bodies under lesser angles. If, therefore, one and the same body which is in reality greater with one eye, is seen less on account of the inequality of the angles in which the pyramids are terminated, (namely, HAF, GBE,*) the body itself must assuredly be seen greater or less at the same time, and to the same person that views it; and, therefore, since the images in each eye are dissimilar (*minime sibi congruunt*) the representation of the object must appear confused and disturbed (*confusa ac perturbata*) to the primary sense."

"This view of the subject," he continues, "is certainly consistent with reason, but, what is truly wonderful is, that it is not correct, for bodies are then seen clearly and distinctly with both eyes when the optic axes are converged upon them. The reason of this, I think, is, that the bodies do not appear to be single, because the apparent images, which are formed from each of them in separate eyes exactly coalesce, (*sibi mutuo exacte congruunt*), but because the common sense imparts its aid equally to each eye, exerting its own power equally in the same manner as the eyes are converged by means of their optical axes. Whatever body, therefore, each eye sees with the eyes conjoined, the common sense makes a single motion, not composed of the two which belongs to each eye, but belonging and accomodated to the imaginative faculty to which it (the common sense) assigns it. Though, therefore, the angles of the optical pyramids which proceed from the same object to the two eyes, viewing it obliquely, are inequal, and though the object appears greater to one eye and less to the other, yet the same difference does not pass into the primary sense if the vision is made only by the axes, as we have said, but if the axes are converged on this side or on the other side of the body, the image of the same body will be seen double, as we shall shew in Book iv., on the fallacies of vision, and the one image will appear greater and the other less on account of the inequality of the angles under which they are seen."†

Such is Aguilonius's theory of binocular vision, and of the union of the two dissimilar pictures in each eye by which a solid body is seen. It is obviously more correct than that of Dr. Whewell and Mr. Wheatstone. Aguilonius affirms it to be contrary to reason that two dissimilar pictures can be united into a clear and distinct picture, as they are actually found to be, and he is therefore driven to call in the aid of what does not exist, a *common sense*, which rectifies the picture. Dr. Whewell and Mr. Wheatstone have cut the Gordian knot by maintaining what is impossible, that in binocular and stereoscpic vision a long line is made to coincide with a short one, and a large surface with a small one; and in place of conceiving this to be done by a common sense overruling optical laws, as Aguilonius supposes, they give to the tender and pulpy retina, the recipient of ocular pictures, the strange power of contracting or expanding itself in order to equallize inequal lines and inequal surfaces!

In his fourth and very interesting book, on the fallacies of distance, magnitude, position, and figure, Auguilonius resumes the subject of the vision of solid bodies. He repeats the theorems of Euclid and Gassendi on the vision of the sphere, shewing how much of it is seen by each eye, and both, whatever be the size of the sphere, and the distance of the observer. At the end of the theorems, in which he demonstrates that when the diameter of the sphere is equal to the distance between the eyes we see exactly a hemisphere, he gives the annexed drawing of the mode in which the sphere is seen by each eye, and by both.

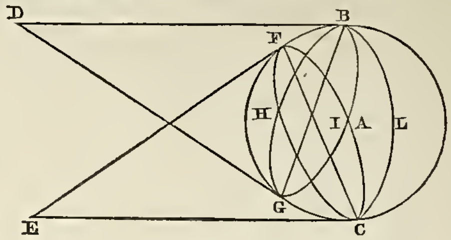

Fig. 3.

In this diagram E is the right eye and D the left, CHFI the section of that part of the sphere BC which is seen by the right eye E, BHGA the section of the part which is seen by the left eye D, and BLC the half of the great circle which the section of the sphere as seen by both eyes. ‡ These three pictures of the solids are all dissimilar. The right eye E does not see the part BLCIF of the sphere; the left eye does not see the part BLCGA, while the part seen with both eyes is the hemisphere BLCGF, the dissimilar segments BFG, CGF being united in its vision.§

After demonstrating his theorems on the vision of spheres with one and both eyes,‖ Aguilonius informs us, before he proceeds to the vision of cylinders,,that it is agreed upon that it is not merely true with the sphere, but also with the cylinder, the cone, and all bodies whatever, that the part which is seen is compreheuded by tangent rays, such as EB, EC for the right eye, in Fig. 3. "For," says he, "since these tangent lines are the outermost of all those which can be drawn to the proposed body from the same point, namely, that in which the eye is understood to be placed, it clearly follows that the part of the body which is seen must be contained by the rays touching it on all sides. For in this part no point can be found from which a right line cannot be drawn to the eye, by which the correct visible form is brought out."¶

Optical writers who lived after the time of Aguilonius seem to have considered the subject of binocular vision as exhausted in his admirable work. Gassendi,** though he treats the subject very slightly, and without any figures, tells us that we see the left side of the nose with the left eye, and the right side of it with the right eye,—two pictures sufficiently dissimilar. Andrew Tacquet,†† though he quotes Aguilonius and Gassendi on the subject of seeing distances with both eyes, says nothing on the binocular vision of solids; and Smith, Harris, and Porterfield, only touch upon the subject incidentally. In commenting on the passage which we have already quoted from Leonardo da Vinci, Dr. Smith says, "Hence we have only one help to distinguish the place of a near object more accurately with both eyes than with one, inasmuch as we see it more detatched from other objects beyond it, *and more of its own surface, especially if it be roundish*."‡‡ If any farther evidence were required that Dr. Smith was acquainted with the dissimilarity of the images of a solid seen by each eye, it will be found in his experiment with a "long ruler placed between the eyebrows, and extended directly forward with its flat sides, respecting the right hand and the left." "By directing the eyes to a remote object," he adds, "the *right side of the ruler seen by the right eye* will appear on the left hand, and *the left side on the right hand*, as represented in the figure."§§

In his Treatise on Optics, published 1775, Mr. Harris, when speaking of the visible or apparent figures of objects, observes, that "we have other helps for distinguishing *prominences of*

* These angles are equal in this diagram and in the vision of a sphere, but they are inequal in other bodies.

† Aguilonius, *Opticorum*, lib. ii. book xxxviii. pp. 140, 141.

‡ It is obvious that a completee hemisphere is not seen with both eyes.

§ Aguilonius, *Opticorum*, lib. iv. 306, 307.

‖ In the last of these theorems Aguilonius describes and explains, we believe for the first time, the *conversion of relief* in the vision of convex and concave surfaces. See Prop. xciv. p. 312.

¶ Id., Id., p. 313.

** *Opera*, tom. ii. p. 394. Lugdumi, 1658.

†† *Opera Mathematica Optica*, tribus libris exposita, p. 136.

‡‡ *Opticks*, vol. ii., Remarks, pp. 41 and 245.

§§ Id., vol. i. p. 48, Fig. 196.

small parts besides those by which we distinguish distances in general, as their degrees of light and shade, and *the prospect we have round them." And by the parallax, on account of the distance betwixt our eyes, we can distinguish besides the front part of the two sides of a near object not thicker than the said distance, and this gives a visible relievo to such objects, which helps greatly to raise or detach them from the plane in which they lie. Thus the nose on a face is the more remarkably raised by our seeing both sides of it at once."** *That is, the relievo is produced by the combination of the two dissimilar pictures given by each eye.*

Without referring to a figure given by Dr. Porterfield, in which he actually gives drawings of an object as seen by each eye in binocular vision,† the one exhibiting the object as seen endwise by the right eye, and the other the same object as seen laterally by the left eye, we may appeal to the experience of every optical, or even of every ordinary observer, in support of the fact, that the dissimilarity of the pictures in each eye, by which we see solid objects, is known to those who have never read it in Galen, Porta, or Aguilonius. Who has not observed the fact mentioned by Gassendi and Harris, that their left eye sees only the left side of their nose, and their right eye the right side, two pictures sufficiently dissimilar? Who has not noticed, as well as Dr. Smith, that when they look at any thin, flat body, such as a thin book, they see both sides of it—*the left eye only the left side of it, and the right eye only the right side*, while the back, or the part nearest the face, is seen by each eye, and both the sides and the back by both the eyes? What student of perspective is there—master or pupil, male or female—who does not know, as certainly as he knows his alphabet, that the picture of a chair or table, or anything else, drawn from *one point of sight*, or as seen by one eye placed in that point is *necessarily dissimilar* to another drawing of the same object taken from another point of sight, or as seen by the other eye placed in a point of $2\frac{1}{2}$ inches distant from the first? If such a person is to be found, we might then admit that the dissimilarity of the pictures in each eye was not known to every student of perspective.‡

Such was the state of our knowledge of binocular vision when two individuals, Mr. Wheatstone and Mr. Elliott, now Teacher of Mathematics in Edinburgh, were directing their attention to the subject. Mr. Wheatstone communicated an important paper on the Physiology of Vision to the British Association at Newcastle in August 1838, and exhibited an instrument called a Stereoscope, by which he united the two dissimilar pictures of solid bodies, the τὰ στέρεα, (*ta sterea* of Aguilonius), and thus reproduced, as it were, the bodies themselves. Mr. Wheatstone's paper on the subject, which had been previously read at the Royal Society on the 21st of June, was printed in their Transactions for 1838.§

Mr. Elliott was led to the study of binocular vision in consequence of having written an Essay, so early as 1823, for the Class of Logic in the University of Edinburgh, " On the means by which we obtain our knowledge of distances by the Eye." Ever since that date he was familiar with the idea, that the relief of solid bodies seen by the eye was produced by the union of the dissimilar pictures of them in each eye, but he never imagined that this idea was his own, believing that it was known to every student of vision. Previous to or during the year 1834, he had resolved to construct an instrument for uniting two dissimilar pictures; or of constructing a stereoscope; but he delayed doing this till the year 1839, when he was requested to prepare an original communication for the Polytechnic Society, which had been recently established in Liverpool. He was thus induced to construct the instrument which he had projected, and he exhibited it to his friends, Mr. Richard Adie, optician, and Mr. George Hamilton, lecturer on chemistry in Liverpool, who bear testimony to its existence at that date. This simple stereoscope, without lenses or mirrors, consisted of a wooden box 18 inches long, 7 broad, and $4\frac{1}{2}$ deep, and at the bottom of it, or rather its further end, was placed a slide containing two dissimilar pictures of a landscape as seen by each eye. Photography did not then exist, to enable Mr. Elliott to produce two views of the same scene, as seen by each eye, but he drew the transparency of a landscape with three distances. The *first* and most remote was the moon and the sky, and a stream of water from which the moon was reflected, the two moons being placed nearly at the distance of the two eyes, or $2\frac{1}{2}$ inches, and the two reflected moons at the same distance. The *second* distance was marked by an old cross about a hundred feet off; and the *third* distance by the withered branch of a tree, thirty feet from the observer. In the right-hand picture, one arm of the cross just touched the disc of the moon, while, in the left-hand one, it projected over one-third of the disc. The branch of the tree touched the outline of a distant hill in the one picture, but was "a full moon's breadth" from it on the other. When these dissimilar pictures were united by the eyes, a landscape, certainly a very imperfect one, was seen in relief, composed of three distances.

Owing, no doubt, to the difficulty of procuring good binocular pictures, Mr. Elliot did not see that his contrivance would be very popular, and therefore carried it no farther. He had never heard of Mr. Wheatstone's stereoscope till he saw his paper on Vison reprinted in the *Philosophical Magazine* for March 1852, and having perused it, he was convinced not only that Mr. Wheatstone's theory of the instrument was incorrect, but that his claim to the discovery of the dissimilarity of the images in each eye had no foundation. He was, therefore, led to communicate to the same journal the fact of his having himself, thirteen years before, constructed and used a stereoscope, which was still in his possession. In making this claim, Mr. Elliot had no intention of depriving Mr. Wheatstone of the credit which was justly due to him; and as the claim has been publicly made, we have described the nature of it as a part of cientific history.

In Mr. Wheatstone's ingenious paper of 1838, the subject of binocular vision is treated at considerable length. He gives an account of the opinions of previous writers, referring repeatedly to the works of Aguilonius, Gassendi, and Baptista Porta, in the last of which the views of Galen are given and explained. In citing the passage which we have already quoted from Leonardo da Vinci, and inserting the figure which illustrates it, he maintains that Leonardo da Vinci was not aware " that the object (c in fig. 2) presented a different appearance to each eye." "*He failed*," he adds, "*to observe this, and no subsequent writer, to my knowledge, has supplied the omission. The projection of two obviously dissimilar pictures on the two retinæ, when a single object is viewed, while the optic axes converge, must therefore be regarded as a new fact in the theory of vision.*" Now, although Leonardo da Vinci does not state in so many words that he was aware of the dissimilarity of the two pictures, the fact is obvious in his own figure, and he was not led by his subject to state the fact at all. But even if the fact had not stared him in the face he must have known it from the Optics of Euclid and the writings of Galen, with which he could not fail to have been well acquainted. That the dissimilarity of the two pictures is *not a new fact* we have already placed beyond a doubt. The fact is expressed in words, and delineated in drawings, by Aguilonius and Baptista Porta. It was obviously known to Dr. Smith, Mr. Harris, Dr. Porterfield, and Mr. Elliot, before it was known to Mr. Wheatstone, and we cannot understand how he failed to observe it in works which he has so often quoted, and in which he professes to have searched for it.

This remarkable property of binocular vision being thus clearly established by preceding writers, and admitted by himself, as the cause of the vision of solidity or distance, Mr. Wheatstone, as Mr. Elliot had done before him, thought of an instrument for uniting the two dissimilar pictures optically, so as to produce the same result that is obtained by the convergence

* *Treatise on Optics*, p. 171; see also sect. 64, p. 113.

† *Treatise on the Eye*, vol. i. p. 412, Plate 5, Fig. 37.

‡ As Mr. Wheatstone himself describes the dissimilar pictures or drawings as " two different projections of the same object seen from *two points of sight*. the distance between which is equal to the interval between the eyes of the observer," it is inconceivable on what ground he could imagine himself to be the discoverer of so palpable and notorious a fact as that the picture of a body seen by two eyes—*two points of sight*, must be dissimilar.

§ *Phil. Trans.*, 1838, pp. 371-394.

of the optical axes. Mr. Elliot thought of doing this by the eyes alone; but Mr. Wheatstone adopted a much better method of doing it by reflection. He was thus led to construct an apparatus, to be afterwards described, consisting of two plane mirrors, placed at an angle of 90°, to which he gave the name of *stereoscope*, anticipating Mr. Elliot both in the construction and publication of his invention, but not in the general conception of a stereoscope.

After describing his apparatus, Mr. Wheatstone proceeds to consider (in a section entitled, "Binocular vision of objects of different magnitudes") "what effects will result from presenting similar images, differing only in magnitude, to analogous parts of the retina." "For this purpose," he says, "two squares or circles, *differing obviously* but not extravagantly in size, may be drawn on two separate pieces of paper, and placed in the stereoscope, so that the reflected image of each shall be equally distant from the eye by which it is regarded. *It will then be seen that notwithstanding this difference they coalesce and occasion a single resultant perception.*" The fact of coalescence being supposed to be perfect, the author next seeks to determine the difference between the length of two lines which the eye can force into coalescences, or "the limits within which the single appearance subsists." He, therefore, unites two images of equal magnitude, by making one of them visually less from distance, and he states that, "by this experiment, *the single appearance of two images of different size is demonstrated.*" Not satisfied with these erroneous assertions, he proceeds to give a sort of rule or law for ascertaining the relative size of the two unequal pictures which the eyes can force into coincidence. The inequality, he concludes, must not exceed the difference "between the projections of the same object when seen in the most oblique position of the eyes (*i.e.*, both turned to the extreme right or extreme left) ordinarily employed." Now, this rule, taken in the sense in which it is meant, is simply *a truism.* It merely states that the difference of the pictures which the eyes *can* make to coalesce is equal to the difference of the pictures which the eyes do make to coalesce in their most oblique position; but though *a truism* is not *a truth,* first, because no real coincidence ever can take place, and, secondly, because no apparent coincidence is effected when the difference of the picture is greater than what is above stated.

From these principles, which will afterwards be shown to be erroneous, Mr. Wheatstone proceeds "to examine *why* two dissimilar pictures projected on the two retinæ *give* rise to the perception *of an object in relief.*" "I will not attempt," he says, "at present to give the complete solution of this question, which is far from being so easy as at first glance it may appear to be, and is, indeed, *one of great perplexity.* I shall, in this case, merely consider the most obvious explanations which might be offered, and show their insufficiency to explain the whole of the phenomena.

"*It may be supposed* that we see only one point of a field of view distinctly at the same instant, the one, namely, to which the optic axes are directed, while all other points are seen so indistinctly that the mind does not recognise them to be either single or double, and that the figure is appreciated by successively directing the point of convergence of the optic axes successively to a sufficient number of its points to enable us to judge accurately of its form.

"That there is *a degree of indistinctness* in those parts of the field of view to which the eyes are not immediately directed, and which increases with the distance from that point, cannot be doubted; and it is also true that the objects there obscurely seen are *frequently doubled.* In *ordinary* vision, it may be said, this indistinctness and duplicity are not attended to, because the eyes shifting continually from point to point, every part of the object is successively rendered distinct, and the perception of the object is not the consequence of a single glance, during which *a small part of it only is seen distinctly,* but is formed from a comparison of all the pictures successively seen, while the eyes were changing from one point of an object to another.

"*All this is* IN SOME DEGREE *true, but were it entirely so* no appearance of relief should present itself when the eyes remain intently fixed on one point of a binocular image in the stereoscope. But in performing the experiment carefully, it will be found, provided the picture do not extend far beyond the centres of distinct vision, that the image is still seen single, and in relief, when in this condition."*

In this passage the author makes a distinction between *ordinary binocular vision,* and binocular vision through the stereoscope, whereas in reality there is none. The theory of both is exactly the same. The muscles of the two eyes unite the two dissimilar pictures, and exhibit the solid, in ordinary vision; whereas in stereoscopic vision the images are united by reflexion or refraction, the eyes in both cases obtaining the vision of different distances by rapid and successive convergences of the optical axes. Mr. Wheatstone notices *the degree of indistinctness* in the parts of the picture to which the eyes are not immediately directed; but he does not notice the "*confusion and incongruity*" which Aguilonius says ought to exist in consequence of some parts of the resulting relievo being seen of one size by the left eye alone,—other parts of a different size by the right eye alone, and other parts by both eyes. This confusion, however, Aguilonius, as we have seen, found not to exist, and he ascribes it to the influence of a *common sense* over-ruling the operation of physical laws. Erroneous as this explanation is, it is still better than that of Mr. Wheatstone, which we shall now proceed to explain.

In order to disprove the theory referred to in the preceding extract, Mr. Wheatstone describes two experiments, which he says *are equally decisive against it,* the first of them only being subject to rigorous examination. With this view he draws "two lines about two inches long, and inclined towards each other on, a sheet of paper, and having caused them to coincide by converging the optic axes to a point nearer than the paper, he looks intently on the upper end of the resultant line without allowing the eyes to wander from it for a moment. The *entire line will appear single,* and in its proper relief, &c.... The eyes," he continues, "sometimes become fatigued, which causes the line to become double at those parts to which the optic axes are not fixed, *but in such case all appearance of relief vanishes.* The same experiment may be tried with small complex figures, but the pictures should not extend too far beyond the centre of the retinæ."

Now these experiments, if rightly made and interpreted, are not *decisive against* the theory. It is not true that the entire line appears single when the axes are converged upon the upper end of the resultant line, and it is not true that the disappearance of the relief when it does disappear arises from the eye being fatigued. In the combination of more complex figures, such as two similar rectilineal figures contained by lines of unequal length, neither the inequalities nor the entire figure will appear single when the axes are converged upon any one point of it.

In the different passages which we have quoted from Mr. Wheatstone's paper, and in the other parts of it which relate to binocular vision, he is obviously halting between truth and error, between theories which he partly believes, and ill-observed facts which he cannot reconcile with them. According to him, certain truths "may be supposed" to be true, and other truths may be "in some degree true," but "not entirely so;" and thus, as he confesses, the problem of binocular and stereoscopic vision is indeed one of great complexity," of which "he will not attempt at present to give the complete solution." If he had placed a proper reliance on the law of visible direction which he acknowledges I have established, and "with which," he says, "the laws of visible direction for binocular vision ought to contain nothing inconsistent," he would have seen the impossibility of the two eyes uniting two lines of inequal length; and had he believed in the law of distinct vision he would have seen the impossibility of the two eyes obtaining single vision of any more than one point of an object at a time. These laws of vision are as rigorously true as any other physical laws,—as completely demonstrated as the law of gravity in Astronomy, or the law of the Sines in Optics; and the moment we allow them to be tampered with to obtain an explanation of physical puzzles, we convert science into legerdemain, and philosophers into conjurors.

* *Phil. Trans.*, 1838, pp. 391, 392.

Such was the state of our stereoscopic knowledge in 1838, after the publication of Mr. Wheatstone's interesting and important paper. Previous to this I communicated to the British Association at Newcastle, in August 1838, a paper in which I established the law of visible direction already mentioned, which though it had been maintained by preceding writers, had been proved by the illustrious D'Alembert to be incompatible with observation, and the admitted anatomy of the human eye. At the same meeting Mr. Wheatstone exhibited his stereoscopic apparatus, which gave rise to an animated discussion on the theory of the instrument. Dr. Whewell maintained that the retina, in uniting, or causing to coalesce into a single resultant impression two lines of different lengths, had the power either of contracting the longest, or lengthening the shortest, or what might have been suggested in order to give the retina only half the trouble, that it contracted the long line as much as it expanded the short one, and thus caused them to combine with a less exertion of muscular power! In opposition to these views, I maintained that the retina, a soft pulpy membrane which the smallest force tears in pieces, had no such power,—that a hypothesis so gratuitous was not required, and that the law of visible direction afforded the most perfect explanation of all the stereoscopic phenomena.

In consequence of this discussion, I was led to repeat my experiments, and to inquire whether or not the eyes in stereocopic vision *did actually* unite the two lines of different lengths, or of different apparant magnitudes. I found that they did not, and no such union was required to convert by the stereoscope two plane pictures into the apparent whole from which they were taken as seen by each eye. These views were made public in the lectures on the *Philosophy of the Senses*, which I occasionally delivered in the College of St. Salvador and St. Leonard, St. Andrews, and the different stereoscopes which I had invented were also exhibited and explained.

In examining Dr. Berkley's celebrated Theory of Vision, I saw the vast importance of establishing the law of visible direction and of proving by the aid of binocular phenomena, and in opposition to the opinion of the most distinguished metaphysicians, that we actually see a third dimension in space, I therefore submitted to the Royal Society of Edingburgh, in January 1843, a paper *On the law of visible position in single and binocular vision, and on the representation of solid figures by the union of dissimilar plane pictures on the retina.* More than twelve years have now elapsed since this paper was read, and neither Mr. Wheatstone nor Dr. Whewell have made any attempt to defend the views which it refutes.

In continuing my researches, I communicated to the Royal Society of Edinburgh, in April 1844, a paper *On the knowledge of distance as given by vision*, in which I described several interesting phenomena produced by the union of *similar* pictures, such as those which form the patterns of carpets and paper-hangings. In carrying on these inquiries I found the reflecting steroscope of little service, and ill fitted, not only for popular use, but for the application of the instrument to various useful purposes. I was thus led to the construction of several new stereoscopes but particularly to the *Lenticular Stereoscope*, now in universal use. They were constructed in St. Andrews and Dundee, of various materials, such as wood, tinplate, brass, and of all sizes, from that now generally adopted, to a microscope variety which could be carried in the pocket. Now geometrical drawings executed for them, and binocular pictures taken by the sun were lithographed by Mr. Scheuck of Edinburgh. Stereoscopes of the lenticular form were made by Mr. London, optician, in Dundee, and sent to several of the nobility in London, and in other places, and an account of these stereoscopes, and of a binocular camera for taken portraits, and copying statues, was communicated to the Royal Scottish Society of Arts, and published in their Transactions.

It had never been proposed to apply the reflecting stereoscope to portraiture or sculpture, or indeed, to any useful purpose; but it was very obvious, the discovery of the Daguerreotype and Talbotype, that binocular drawings could be taken with such accuracy as to exhibit in the stereoscope excellent representations in relief, both of living persons, buildings, landscape scenery and every variety of sculpture. In order to shew its application to the most interesting of these purposes, Dr. Adamson of St. Andrews, at my request, executed two binocular portraits of himself, which were generally circulated and greatly admired. This successful application of the principal to portraiture was communicated to the public, and reccommended as an art of great domestic interest.

After endeavoring in vain to induce opticians, both in London and Birmingham; (where the instrument was exhibited in 1849 to the British Association,) to construct the lenticular stereoscope, and photographers to execute binoculor pictures for it, I took with me to Paris, in 1850, a very fine instrument, made by Mr. Loudon in Dundee, with the binocular drawings and portraits already mentioned. I shewed the instrument to the Abbé Moigno, the distinguished author of *L'Optique Moderne*, to M. Soleil and his son-in-law, M. Duboscq, the eminent Parisian opticians, and to some members of the Institute of France. These gentlemen saw at once the value of the instrument, not merely as one of amusement, but as an important auxiliary in the arts of portraiture and sculpture. M. Duboscq immediately began to make the lenticular stereoscope for sale, and executed a series of the most beautiful binocular Daguerreotypes of living individuals, statues, bouquets of flowers, and objects of natural history, which thousands of individuals flocked to examine and admire. In an interesting article in *La Presse*,* the Abbé Moigno gave the following account of the introduction of the instument into Paris:—

"In his last visit to Paris, Sir David Brewster intrusted the models of his stereoscope to M. Jules Duboscq, son-in-law and successor of M. Soleil, and whose intelligence, activity and affability will extend the reputation of the distinguished artists of the Rue de l'Odeon, 35. M. Jules Duboscq has set himself to work with indefatigable ardor. Without requiring to have recourse to the binocular camera, he has, with the ordinary Daguerreotype apparatus, procured a great number of dissimilar pictures of statues, bas-reliefs, and portraits of celebrated individuals, &c. His stereoscopes are constructed with more elegance, and even with more perfection, than the original English (Scotch) instruments and while he is shewing their wonderful effects to natural philosophers and amateurs who have flocked to him in crowds, there is a spontaneous and unanimous cry of admiration."

While the lenticular stereoscope was thus exciting much interest in Paris, not a single instrument had been made in London, and it was not till a year after its introduction into France that it was exhibited in England. In the fine collection of philosophical instrument which M. Duboscq contributed to the Great Exhibition of 1851, and for which he was honored with a Council medal, he placed a lenticular stereoscope, with a beautiful set of binocular Daguereotypes. This instrument attracted the particular attention of the Queen, and before the closing of the Crystal Palace, M. Duboscq executed a beautiful stereoscope, which I presented to Her Majesty in his name. In consequence of this public exhibition of the instrument, M. Duboscq received several orders from England, and a large number of stereoscopes were thus introduced into this country. The demand, however, became so great, that opticians of all kinds devoted themselves to the manufacture of the instrument, and photographers, both in Daguerreotype and Talbotype, found it a most lucrative branch of their profession, to take binocular portraits of views to be thrown into relief by the sterescope. Its application to sculpture, which he had pointed out, was first made in France, and an artist in Paris actually copied a statue from the *relievo* produced by the stereoscope.

Three years after I had published a description of the lenticular stereoscope, and after it had been in general use in France and England, and the reflecting stereoscope forgotten, Mr. Wheatstone printed, in the *Philosophical Transactions* for 1852, a paper on Vision in which he says that he had previously used "apparatus in which *prisms* were employed to deflect the rays of light proceeding from the pictures so as to make them appear

* December 28, 1850.

to occupy the same plane;" and he adds, "I have called it the *refracting* stereoscope."* Now, whatever Mr. Wheatstone may have done with prisms, and at whatever time he may have done it, I was the first person who published a description of stereoscopes both with *refracting* and reflecting prisms; and during the three years that elapsed after he had read my paper, he made no claim to the suggestion of prisms till after the great success of the lenticular stereoscope. The reason why he then made the claim, and the only reason why we do not make him a present of the suggestion, will appear from the following history:—

In the paper above referred to, Mr. Wheatstone says, "I recommend, as a convenient arrangement of the *refracting* stereoscope for viewing Daguerreotypes of small dimensions, the instrument represented, (Fig. 4,) shortened in its length from 8 inches to 5, and lenses 5 inches focal distance, placed before and close to the prisms."† Although this refracting apparatus, which is simply a *deterioration* of the lenticular stereoscope, is recommended by Mr. Wheatstone, nobody either makes it or uses it. The semi-lenses or quarter lenses of the lenticular stereoscope *include a virtual and absolutely perfect prism*, and, what is of far more consequence, each lens is a variable lenticular prisms, so that, when the eye-tubes are placed at different distances, the lenses have different powers of displacing the pictures. They can thus unite pictures placed at different distances, which cannot be done by any combination of whole lenses and prisms.

In the the autumn of 1854, after all the facts about the stereoscope were before the public, and Mr. Wheatstone in full possession of all the merit of having anticipated Mr. Elliot in the publication of his stereoscopic apparatus and of his explanation of the theory of stereoscopic relief, such as it was, he thought it proper to revive the controversy by transmitting to the Abbè Moigno, for publication in *Cosmos*, an extract of a letter of mine dated 27th September 1838. This extract was published in the *Cosmos* of the 15th August 1854, ‡ with the following illogical commentary by the editor.

"Nous avons eu tort mille fois d'accorder à notre illustre ami, Sir David Brewster, l'invention du stéréoscope par réfraction. M. Wheatstone, en effet, a mis entre nos mains une lettre datée, le croirait on, du 27 Septembre 1838, dans lequel nous avons lû ces mots écrits par l'illustre savant Ecossais: 'I have also stated that you promised to order for me your stereoscope, both with reflectors and PRISMS. J'ai aussi dit (à Lord Rosse§) que vous aviez promis de commander pour moi votre stéréoscope, celui avec réflecteurs et celui avec prisms.' Le stéréoscope, par réfraction est donc, aussi bien que le stéréoscope par réflexion, le stéréoscope de M. Wheatstone, qui l'avait inventé en 1838, et le faisait construire à cette époque pour Sir David Brewster lui-même. Ce que Sir David Brewster a imaginée, et c'est une idée très ingénieuse, dont M. Wheatstone ne lui disputât jamais la gloire, c'est de former les deux prismes du stéréoscope par réfraction avec les deux prismes du stéréoscope par réfraction avec les deux moitiés d'une même lentille."

That the reader may form a correct idea of the conduct of Mr. Wheatstone in making this claim indirectly, and in a foreign journal, whose editor he has willingly misled, I must remind him that I first saw the reflecting stereoscope at the meeting of the British Association at Newcastle, in the Middle of *August* 1838. It is proved by my letter that he and I then conversed on the subject of *prisms*, which at that time he had never thought of. I suggested prisms for displacing the pictures, and Mr. Wheatstone's natural reply was, that they must be *achromatic prisms*. This fact, if denied, may be proved by various circumstances. His paper of 1838 contains no reference to prisms. If he had suggested the use of prisms in August 1838, he would have inserted his suggestion in that paper, which was then unpublished; and if he had *only once* tried a prism stereoscope, he never would have used another. On my return to Scotland, I ordered from Mr. Andrew Ross one of the reflecting stereoscopes, and one made with achromatic prisms; but my words do not imply that Mr. Wheatstone was the first person who suggested prisms, and still less that he ever made or used a stereoscope with prisms. But however this may be, it is a most extraordinary statement, which he allows the Abbé Moigno to make, and which, though made a year and a half ago, he has not enabled the Abbé to correct, *that a stereoscope with prisms was made for me* (or for any other person) *by Mr. Ross*. I never saw such an instrument, or heard of its being constructed: I supposed that after our conversation Mr. Wheatstone might have tried acromatic prisms, and in 1848, when I described my single prism stereoscope, I stated what I now find is not correct, that *I believed* Mr. Wheatstone had used *two* achromatic prisms. The following letter from Mr. Andrew Ross will prove the main fact that he never constructed for me, or for Mr. Wheatstone, any refracting stereoscope:—

"2, FEATHERSTONE BUILDINGS,
28th September 1854.

"DEAR SIR,—In reply to yours of the 11th instant, I beg to state that I never supplied you with a stereoscope in which prisms were employed in place of plane mirrors. I have a perfect recollection of being called upon either by yourself or Professor Wheatstone, some fourteen years since, to make achromatized prisms for the above instrument. I also recollect that I did not proceed to manufacture them in consequence of the great bulk of an achromatized prism, with reference to their power of deviating a ray of light, and at that period glass sufficiently free from striæ could not readily be obtained, and was consequently very high-priced.—I remain, &c. &c.

ANDREW ROSS.

"To Sir David Brewster."

Upon the receipt of this letter I transmitted a copy of it to the Abbé Moigno, to shew him how he had been misled into the statement, "that Mr. Wheatstone had caused a stereoscope with prisms to be constructed for me;" but neither he nor Mr. Wheatstone have felt it their duty to withdraw that erroneous statement.

In reference to the comments of the Abbé Moigno, it is necessary to state, that when he wrote them he had in his possession my printed description of the single prism, and other stereoscopes,¶ in which I mention my belief, now proved to be erronous, that Mr. Wheatstone had used achromatic prisms, so that he had, on my express authority, the information which surprised him in my letter. The Abbé also must bear the responsibility of a glaring misinterpretation of my letter of 1838. In that letter I say that Mr. Wheatstone promised *to order certain things from Mr. Ross*, and the Abbé declares, contrary to the express terms of the letter, as well as to fact, *that these things were actually constructed for me*. The letter, on the contrary, does not even state that Mr. Wheatstone complied with my request, and it does not even appear from it that the reflecting stereoscope was made for me by Mr. Ross.

Such is a brief history of the lenticular stereoscope, of its introduction into Paris and London, and of its application to portraiture and sculpture. It it now in general use over the whole world, and it has been estimated that upwards of half a million of these instruments have been sold. A Stereoscope Company has been established in London‖ for the manufacture and sale of the lenticular stereoscope, and for the production of binocular pictures for educational and other purposes. Photographers are now employed in every part of the globe in taking binocular pictures for the instrument,—among the ruins of Pompeii and Herculaneum—on the glaciers and in the valleys of Switzerland —among the public monument in the Old and the New World

* *Phil. Trans.*, 1852. p. 6.

† *Ibid.* pp. 9. 10.

‡ Vol. v. livre. viii. p. 241.

§ Andrew Ross, the celebrated optician!

¶ The Abbé gave an abstract to this paper in the French Journal *La Presse*, December 28, 1850.

‖ No. 54. Cheapside, and 313, Oxford Street. The prize of twenty guineas which they offered for the best short popular treatise on the Stereoscope, has been adjudged to Mr. Lonie, Teacher of Mathematics in the Madras Instution, St. Andrews. The second prize was given to the Rev. R. Graham, Abernyte, Perthshire.

—amid the shipping of our commercial harbors.—in the museums of ancient and modern life—in the sacred precincts of the domestic circle—among those scenes of the picturesque and the sublime which are so affectionately associated with the recollection of our early days, and amid which, even at the close of life, we renew, with loftier sentiments and nobler aspirations, the youth of our being, which, in the worlds of the future, is to be the commencement of a longer and a happier existence.

CHAPTER II.

ON MONOCULAR VISION, OR VISION WITH ONE EYE.

In order to understand the theory and construction of the stereoscope we must be acquainted with the general structure of the eye, with the mode in which the images of visible objects are formed within it, and with the laws of vision by means of which we see those objects in the position which they occupy, that is, in the direction and at the distance at which they exist.

Every visible object radiates, or throws out in all directions, particles or rays of light, by means of which we see them either directly or indirectly by the images of them formed by their passing through a small hole, or through a lens placed in a dark room or *camera*, at the end of which is a piece of paper or ground glass to receive the image.

In order to understand this let H be a very small pinhole in a shutter or camera, MN, and RYB be any object of different colors, the upper part, R, being *red* the middle Y, *yellow*, and the lower part, B, *blue.* If a sheet of white paper, *br*, is placed behind the hole H, at the same distance as the object RB is before it an image, *br*, will be formed of the same ray and the same colors as the object RB. As the particles or rays of light move

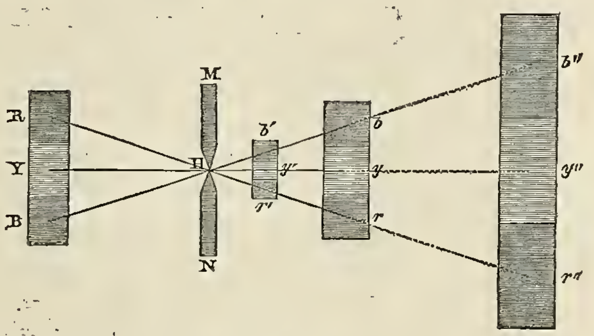

Fig. 4.

in straight lines, a *red* ray from the middle part of R will pass through the hole H and illuminate the point *r* with *red* light. In like manner, rays from the middle points of Y and B will pass through H and illuminate with *yellow* and *blue* light the points *y* and *b*. Every other point of the colored spaces, R, Y, and B, will in the same manner, paint itself, as it were, on the paper, and produce a colored image, *byr*, exactly the same in form and color as the object R Y B, If the hole H is sufficiently small no ray from any one point of the object will interfere with or mix with any other ray that falls upon the paper. If the paper is held at *half* the distance, at *b' y'* for example, a colored image, *b'y'r'* of half the size, will be formed, and if we hold it at twice the distance, at *b''r''* for example, a colored image, *b''y''r''* of *twice* the size, will be painted on the paper.

As the whole H is supposed to be so small as to recieve only one ray from every point of the object, the images of the object viz, *br*, *b'r'*, *b''r''*, will be very faint. By widening the hole H so as to admit more rays from each luminous point RB, the images would become brighter, but they would become at the same time indistinct, as the rays from one point of the object would mix with those from adjacent points, and at boundaries of the colors R,Y, and B, the one color would obliterate the other. In order, therefore, to obtain sufficiently bright images of visible objects we must use *lenses*, which have the property of forming distict images behind them, at a point called their focus. If we widen the hole H, and place in it a lens whose focus is at *y*, for an object at the same distance, HY, it will form a bright and distinct image, *br*, of the same size as the object RB. If we remove the lens, and place another in H, whose focus is at *y'*, for a distance HY, an image, *b'r'*, half of the size RB, will be formed at that point; and if we substitute for this lens another, whose focus is at *y''*, a distinct image *b''r''*, *twice* the size of the object, will be formed, the size of the image being always to that of the object as their respective distances from the hole or lens at H.

With the aid of these results, which any person may confirm by making the experiments, we shall easily understand how we see external objects by means of the images formed in the eye. The human eye, a section and a front view of which is shewn in Fig. 5, A is almost a sphere. Its outer membrane, A B C D E, or MNO, Fig. 5, B, consists of a tough substance, and is called the *sclerotic* coat, which forms the *white of the eye*, A, seen in the front view. The front part of the eyeball, CXD, which resembles a small watch-glass is perfectly transparent, and is called the *cornea.* Behind it is the *iris, cabe*, or C in the front view, which is a circular disc, with a hole, *ab*, in its centre, called the *pupil*, or *black of the eye.* It is, as it were, the *window* of the eye, through which all the light from visible objects must pass.

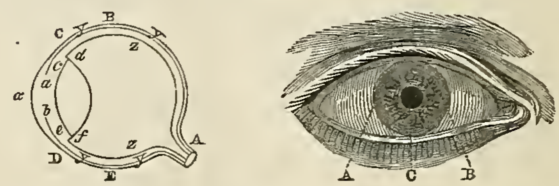

Fig. 5, A.

The *iris* has different colors in different persons, *black*, *blue*, or *grey*; and the pupil, *ab*, or H, has the power of contracting or enlarging the size according as the light which enters it is more or less bright. In sunlight it is very small, and in twi-light its size is considerable. Behind the iris, and close to it, is a doubly convex lens, *d f*, or LL in Fig. 5, B, called the *crystalline lens.*

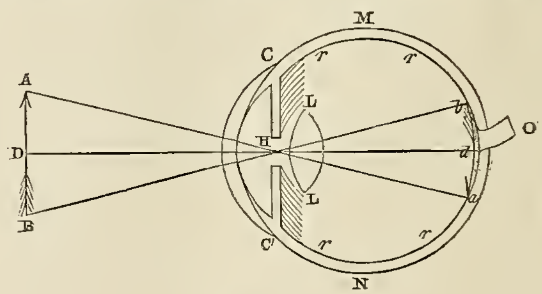

Fig. 5, B.

It is more convex or round on the inner side, and it is suspended by the *ciliary* processes at LC, LC' by which it is supposed to be moved towards and from H, in order to accommodate the eye to different distances, or obtain distinct vision at these distances. At the back of the eye is a thin pulpy transparent membrane, *rr* O *rr*, OR *vvv*, called the *retina*, which, like the ground glass of a camera obscura, receives the images of visible objects. This membrane is an expansion of the optic nerve O, or A in Fig. 5 A, which passes to the brain, and, by a process of which we are ignorant, gives us vision of the objects whose images are formed on its expanded surface. The globular form of the eye is maintained by two fluids which fill it,—the *aqueous humor*, which lies between the crystalline lens and the cornea, and the *vitreous humor*, ZZ, which fills the back of the eye.

But though we are ignorant of the manner in which the mind takes cognizance through the bain of the images on the retina, and may probably never know it, we can determine experimently the laws by which we obtain, through their images on the retina, a knowledge of the direction, the position, and the form of external objects.

If the eye MN consisted only of a hollow ball with a small aperture H, an inverted image, *ab*, of any external object AB would be formed on the retina *ror*, exactly as in Fig. 4. A ray of light from A passing through H would strike the retina at *a*, and one from B would strike the retina at *b*. If the hole H is very small the inverted image *ab* would be very distinct, but very obscure. If the hole were the size of the pupil the image would be sufficiently luminous, bnt very indistinct. To remedy this the crystalline lens is placed behind the pupil, and gives distinctness to the image *ab* formed in its focus. The image, however, still remains inverted, a ray from the *upper* part A of the object necessarily falling on the lower part *a* of the retina, aud a ray from the *lower* part B of the object upon the upper part *b* of the retina. Now, It has been proved by accurate experiment that in whatever direction a ray A H *a* falls upon the retina, it gives us the vision of the point A from which it proceeds, or causes us to see that point, in a direction perpendicular to the retina at *a*, the point on which it falls . It has also been proved that the hnman eye is nearly sperical, and that a line drawn perpendicular to the retina from any point *a* of the image *ab* will very nearly pass through the corresponding point A of the object A B, * so that the point A is, in virtue of this law, which is called the *Law of visible direction*, seen in nearly its true directiou.

When we look at any object, A B, for example, we see only one point of it distinctly. In Fig. 5 the point D only is seen distinctly, and every point from D to A, and from D to B, less distinctly. The point of distinct vision on the retina is at *d*, corresponding with the point D of the object which is seen distinctly. This point *d* is the centre of the retina at the extremity of the line A H*a*, called the optical axis of the eye, passing through the centre of the lens L*k*, and the ccutre of the pupil. The point of distinct vision *d* corresponds with a small hole in the retina called the *Foramen centrale*, or *central hole*, from its being in the centre of the membrane. When we wish to see the points A and B, or any other point of the object, we turn the eye upon them, so that their image may fall upon the central point *d*. This is done so easily and quickly that every point of an object is seen distinctly in an instant, and we obtain the most perfect knowledge of its form, color, and direction. Thc law of distinct vision may be thus expressed. Vision is most distinct when it is performed by the central point of the retina, aud the distinctness decreases with the distance from the central point. It is a curious fact, however, that the most *distinct point d is the least sensitive to light*, aud that sensitiveness increases with the distance from that point. This is proved by the remarkable fact, that when an astronomer cannot see a minute star by lookiug at it directly along the optical axis *d*D, he can see *it by looking away from it*, and bringing its image upon a more sensitive part of the retina.

But though wc see with one eye the direction in which any object or point of an object is situated, we do not see its position or the distance from the eye at which it is placed. If a small luminous point or flame is put into a dark room by another person, we cannot with one eye form anything like a correct estimate of its distance. Even in good light we cannot with one eye snuff a caudle, or pour wine into a small glass at arm's length. In monocular vision, we learn from experience to estimate all distances, but particularly great ones, by various means, which are called thc *criteria of distance*; but it is only with both eyes that we can estimate with anything like accuracy the distance of objects not far from us.

The *criteria of distance*, by which we are enabled with one eye to form an approximate estimate of the distance of objects are five in number.

1. The interposition of numerons objects between the eye and the object whose distance we are appreciating. A distance at sea appears much shorter than the same distance on land, marked with houses, trees, and other objects; and for the same reason, the sun and moon appear more distant when rising or setting on the horizon of a flat country, that when in the zenith, or at great altitudes,

2. The variation in the apparent magnitude of known objects, such as man, animals, trees, doors and windows of honses. If one of two men, placed at different distances from us, appears only half the size of the other, we cannot be far wrong in believing that the smallest in appearance is at twice the distance of the other. It is possible that the one may be a dwarf, and the other of gigantic stature, in which case our judgment would be erroneous, but even in this case other criteria might enable us to correct it.

3. The degree of vivacity in the colors and tints of objects.

4. The degree of distinctness in the outline and minute parts of objects.

5. To these criteria we may add the sensation of muscular action, or rather effort, by which we close the pupil in accommodating the eye to near distances, and prodnce the accommodation.

With all these means of estimating distances, it is only by binocular vision, in which we converge the optical axes upon the object, that we have the power of *seeing distance* within a limited range.

But this is the only point in which Monocular is *inferior* to Binocular vision. In the following respects it is *superior* to it.

1. When we look at oil paintings, the varnish on their surface reflects to each eye the light which falls upon it from certain parts of the room. By closing one eye we shut out the quantity of reflected light which enters it. Pictures should always be viewed by the eye farthest from windows or lights in the apartment, as light dimminishes the sensibility of the eye to the rcd rays.

2. When we view a picture with both eyes, we discover, from the convergency of the optic axes, that the picture is on a plane surface, every part of which is nearly equidistaut from us. But when we shut one eye, we do not make this discovery: and therefore the effect with which the artist gives relief to the painting exercises its whole effect in deceiving us, and hence iu monocular vision, thc *relievo* of thc painting is much more complete.

This influence over our judgment is beautifully shewn in viewing, with one eye, photographs either of persons, or landscapes, or solid objects. After a little practice, the illusion is very perfect, and is aided by the correct geometrical perpective and *chiaroscuro* of the Daguerreotype or Talbotype. To this effect we may give the name of *Monocular Relief*, which as we shall see, is necessarily inferior to *Binocular Relief*, when producd by the stereoscope.

3. As it very frequently happens that one eye has not exactly the same focal length as the other, and that, when it has, the vision by one eye is less perfect than that by the other, the picture formed by uniting a perfect with a less perfect picture, or with one of a different size, must be more imperfect than the single picture formed by one eye.

CHAPTER III.

ON BINOCULAR VISION, OR VISION WITH TWO EYES.

We have already seen, in the history of the stereoscope, that in the binocular vision of objects, each eye sees a different picture of the same object. In order to prove this, we require only to look attentively at our own hand held up before us, and observe how some parts of it disappear upon closing each eye. This experiment proves, at the same time, in opposition to the opinion of Baptista Porta, Tacquet, and others, that we always see two pictures of the same object combined in one. In confirmation of this fact, we have only to push aside one eye, and observe the image which belongs to it separate from the other, and again unite with it when the pressure is removed.

It might have been supposed that an object seen by both eyes would be seen twice as brightly as with one, on the same principle as the light of two candles combined is twice as bright as the light of one. That this is not the case has been long known, and Dr. Jurin has proved by experiments, which we have carefully repeated and found correct, that the brightness of objects seen with two eycs is only $\frac{1}{13}$th part greater than when they are seen with onc.† The cause of this is well known. When

* *Edinburgh Transactions*, vol. xv. p. 349, 1843 ; or *Philosophical Magazine*, vol. xxv. pp. 356, 439. May and June 1844.

† Smith's *Opticks*, vol. ii., Remarks, p. 107. Harris makes the difference one-tenth or one-eleventh ; *Optics*, p. 117.

both eyes are used, the pupils of each contract so as to admit the proper quantity of light; but the moment we shut the right eye, the pupil of the left dilates to nearly twice its size, to compensate for the loss of light arising from the shutting of the other.*

This beautiful provision to supply the proper quantity of light when we can use only one eye, answers a still more important purpose, which has escaped the notice of optical writers. In binocular vision, as we have just seen, certain parts of objects are seen with both eyes, aud certain parts only with one; so that, if the parts seen with both eyes were twice as bright, or even much brighter than the parts seen with one, the object would appear spotted, from the different brightness of its parts. In Fig. 6, for example, see page, 267, the areas B F I and C G I, the former of which is seen

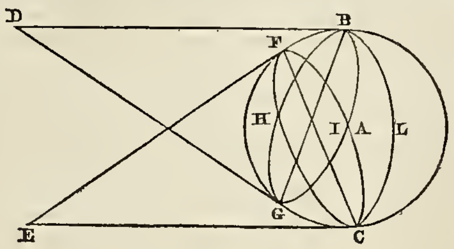

Fig. 6.

only by the left eye, D, and the latter only by the right eye, E, and the corresponding areas on the other side of the sphere, would be only half as bright as the portion F I G H, seen with both eyes, and the sphere would have a singular appearance.

It has long been, and still is, a vexed question among philosophers, how we see objects single with two eyes. Baptista Porta, Tacquet, and others, got over the difficulty by denying the fact, and maintaining that we use only one eye, while philosophers of distinguished eminence have adopted explanations still more groundless. The law of visible direction supplies us with the true explanation.

Let us first suppose that we look with both eyes, R and L, Fig. 7, upon a luminous point, D, which we see single, though

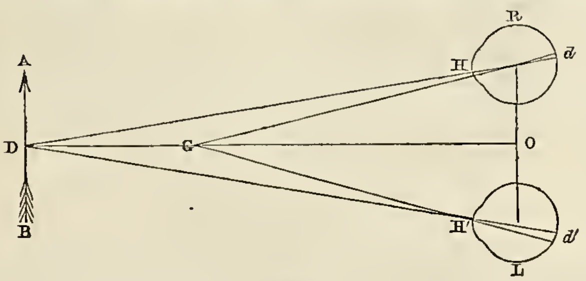

Fig. 7.

there is a picture of it on the retina of each eye. In looking at the point D we turn or converge the optical axes d H D, d'H'D, of each eye to the point D, an image of which is formed at d in the right eye R, aud at d' in the left eye L. In virtue of the law of visible direction the point D is seen in the direction d D with the eye R, and in the direction d'D with the eye L, these lines being perpendicular to the retina at the points d, d'. The one image of the point D is therefore seen lying upon the other, and consequently seen single. Considering D, then, as a single point of a visible object A B, the two eyes will see the points A and B single by the same process of turning or converging upon them their optical axes, and so quickly does the point of convergence pass backward and forward over the whole object, that it appears single, though in reality only one point of it can be seen single at the same instant. The whole picture of the line A B, as seen with one eye, *seems* to coincide with the whole picture of it as seen with the *other*, and to appear single. The same is true of a surface or area, and also of a solid body or a landscape. Only one point of each is seen single; but we do not observe that other points are double or indistinct, because the images of them are upon parts of the retina which do not give distinct vision, owing to their distance from the *foramen* or point which gives distinct vision. Hence we see the reason why distinct vision is obtained only on one point of the retina. Were it otherwise we should see every other point double when we look fixedly upon one part of an object. If in place of *two* eyes, we had a *hundred*, capable of converging their optical axis, to one point, we should, in virtue of the law of visible direction see only *one* object.

The most important advantage which we derive from the use of two eyes is to enable us to *see distance*, or a third dimension in space. That we have this power has been denied by Dr. Berkeley, and many distinguished philosopners, who maintain that our perception of distance is acquired by experience, by means of the criteria already mentioned. This is undonbtedly true for great distances, but we shall presently see, from the effects of the stereoscope, that the successive convergency of the optic axes upon two points of an object at different distances, exhibits to us the difference of distance when we have no other possible means of perceiving it. If, for example, we suppose G, D, Fig. 7, to be seperate points, or parts of an object, whose distances are GO, DO, then if we converge the optical axes HG, H'G, upon G, and next turn them upon D, the points, will appear to be situated at G and D at the distance GD from each other, and at the distances OG, OD from the observer, although there is nothing whatever in the appearance of the points, or in the lights and shades of the objects, to indicate distance. That this vision of distances is not the result of experience is obvions from the fact that distance is seen as perfectly by children as by adults; and it has been proved by naturalists that animals newly borne appreciate distances with the greatest correctness. We shall afterwards see that so infallible is onr vision of near distances, that a body whose real distances we can ascertain by placing both our hands upou it, will appear at the greater or less distance at which it is placed by the convergency of the optical axes.

We are now prepared to understand generally, how, in binocular vision, we see the difference between a picture and a statue, and between a real landscape and its representation. When we look at a picture of which every part is nearly at the same distance from the eyes, the point of convergence of the optical axes is nearly at the same distance from the eyes; but when we look at its origiual, whether it be living man, a statue, or a landscape, the optical axes are converged in rapid succession upon the nose, the eyes, and the ears, or upon objects in the foreground, the middle and the remote distances in the landscape, and the relative distances of all these points from the eye are instantly perceived.—The *binocular relief* thus seen is greatly superior to the *monocular relief* already described.

Since objects are seen in relief by the apparant uniou of two dissimilar plane pictures of them formed in each eye, it was a supposition hardly to be overlooked, that if we could delineate two plane pictures of a solid object, as seen dissimilarly with each eye, and unite their images by the convergency of the optical axes, we should see the solid of which they were the representation. The experiment was accordingly made by more than one person, and was found to succeed; but as few have the power, or rather the art, of thus converging their optical axes, it became necessary to contrive an iustrument for doing this.

The first contrivances for this purpose were, as we have already stated, made by Mr. Elliot and Mr. Wheatstone. A description of these, and of others better fitted for the purpose, will be found in the following chapter.

(*To be Continued.*)

— No authority, however great, can change error into truth.

* This variation of the pupil is mentioned by Bacon.

From the Jour. of the Phot. Soc.

METHOD OF CLEANING DAGUERREOTYPE PLATES.

To the Editor of the Photographic Journal:

SIR,—I forward herewith my method of cleaning daguerreotype plates, but I hope that we are on the eve of great improvements in this branch of photography. I would suggest the possibility of driving off the old photograpic impression by heat, and cleaning by some chemical instead of mechanical process, if the present thickness of metal be retained; but the best thing of all would be the using of silver foil, which would simply require immersing in cyanide of posassium or "pickle" and rinsing with water to make it ready for use.

Yours respectfuly,
EDW. MONSON.

The daguerreotype process requires the plates to be chemically clean; nine failures out of ten arise from dirty plates. The dirt is sometimes left from the cleaning of the plate, but very often it arises from the *pollishing buffs* being damp and leaving the polishing powder adhering to the plate; the picture is thus taken with bromo-iodide of silver and dirt, instead of with the pure preparation.

I clean my plates with *neet's foot oil* and rotten-stone; the small ones with a lathe, the large ones with a machine.

Put some oil upon the buff, dust some rotten-stone upon it from a box tied over with a piece of muslin: give the lathe a turn for a minute or so, and the plate is clean; if it be a large one, I first put it into an American clamp, rub off the impression with a straight buff, and finish it in a machine. My reason for giving it the first buffing is to clean out all the hollows, the large plates unfortunately seldom being flat. Buff off the oil with a straight buff, well wipe the back edges, lay the silver side upon a large buff, dusted with rotten-stone, and rub it in a circular direction until it is perfectly bright; put it into the box for oily plates, which must not be used for clean ones, and do another; when sufficient are cleaned they may be burned. I usually get all the plates I require for the day thus far ready before breakfast, so as never to have oil buffs about with polishers. When I have cleaned sufficient plates for the day, I next burn them, to remove the little oil left from the rubbing. I have two little supports with nicks, about 2 inches apart I take several stair-rods and rest the ends upon these supports, then lay upon the rods a number of plates and burn them with naptha or with a long jet of gas; the gas will not black the plate unless the flame touches it. The plate in burning, if there be any oil upon it, first becomes yellow, then of a steel color; at the same time the copper at the edges becomes of a dark red, and if there be any dust upon the plate small white circles will form; these are the conditions when the burning is finished. But if the flame be large the burning must be stopped short of this point, as the heat continues to act after the lamp is withdrawn. If the copper becomes purple and the silver white, the polishing buff will not fetch off the white film but it can be removed with cyanide of potassium; well wash off, rinse with distilled water, and dry. If the plates become cloudy, or if an old impression appears, they must be cleaned again; if the plate remains yellow the silver is alloyed, or the plate is only half cleaned, a second cleaning will soon decide which it is. If the plate be alloyed, it reduces the intensity of the picture in the same way as if dirt or a film were over it.

Instead of burning the plates, the oil may be removed by making a paste of precipitated chalk and alcohol; rub this all over the plate with cotton wool and let it dry; if the plate be clean, it will come off by slightly brushing it with cotton wool. I object to this plan, because if the plate be not perfectly clean, you have no check upon the cleaning, as you have when you burn it.

I object, moreover, to the use of camphine and essential oils, because (as in the chalk paste) there is no check upon the cleaning, and unless the velvets and rags are frequently changed, the plates will not be perfectly clean: plates may be cleaned in this way if the operator clean them himself but it is very unsafe to trust to assistants. I also object to acids and water, unless the plate is perfectly dried by heat afterwards. I have tried all these plans, but with me none succeeds so well as the one with oil and rotten-stone followed by burning.

The velvet and velveteen should have a close stiff pile, and be washed before using to free them from dye and dressing. The lathe, buffs, and the straight buff are covered with velveteen, the large buff for finishing with velvet. I wash this velvet when it gets dirty and use it again; the velveteen I save, and when I have got a quantity I burn it to recover the silver. If old rags be used to wipe the oil off the backs of the plates, they may be burnt as well: much more silver may be recovered than one would at first suppose.

From La Lumiere.

NOTES ON THE PHOTOGRAPHIC IODIDE OF LEAD.

BY M. ROUSSIU.

A long and highly interesting article has appeared in the *Journal de Pharmacie*, by M. Roussiu, chemist, on iodide of zinc and its applications to Photography. We deem it our duty to give our readers as complete a summary of it as possible.

On precipitating a neutral salt of lead by a soluble iodide, such as iodide of potassium, a yellow precipitate is formed, which is in fact iodide of lead. If the liquids be perfectly neutral, the precipitate is of a pure yellow, and not crossed with red or orange. The slightest trace of alkalinity weakens the yellow shade; and the presence of a free acid communicates an orange tint to the precipitate by a certain quantity of iodide brought out thereby.

The action of light on the iodide of lead is singular. If a little starch water be poured upon iodide of lead and stood away for a short time, the mass will assume a decided light green tint, arising from the combination of the yellow color of the undecomposed iodide of lead and the blue color formed by the starch. It is easy to prove this combination of colors. By treating iodide of lead with bicarbonate of potash in presence of starch, white carbonate of lead will be formed, which, decomposed by a few drops of acetic acid, will leave a residuum of iodide of starch with its beautiful violet color, and on which all its properties may be proved. The reaction is fundamentally the same as that which takes place on the daguerrean plate, a disengagement of iodine, and formation of a sub-salt under the influence of light.

"We have dissolved," says the writer, "acetate of lead in strong starch water. A certain quantity of this liquid was precipitated by iodide of potassium by candlelight, and the precipitate, kept in the body of the liquid for two days in complete obscurity, had not changed, notwithstanding frequent shaking. The test tube was then suddenly exposed to the solar rays—the action was instantaneous; in less than a second the surfaces struck by the light assumed a green tint which increased in intensity on a longer exposure. The reaction still went on under the solar influence, and the starch continually taking up the iodine brought out by the light urged on the gradually advancing decomposition. In this case, the decomposition of iodide of lead is spontaneous from the first; the starch plays merely the character of a witness and continuating agent. As to whether the air interferes with the reaction, two experiments, one in hydrogen, the other in carbonic acid, do not permit of such a supposition. In both cases, the coloration under the influence of the light, was as clear and as rapid as in contact with the air."

The following are a few other experiments made by the author on iodide of lead. He prepared a certain quantity of very pure iodide of lead, and mixed it moist with starch paste, by spreading it upon a sheet of white paper by the light of a lamp. Spread this sheet of paper upon a piece of pasteboard with the yellow side up, and lay upon its surface a piece of black lace, and expose rapidly to the light. In about one minute the lace will be most admirably and faithfully copied. Not only all the

apparent details will be rendered, but parts scarcely perceptible in the original will be reprodnced. The inventor has thus reproduced leaves, ostrich feathers, lizard skins, etc. A fixing agent was yet to be discovered, and after much experiment, the inventor conceived the idea of introducing the active agent; that is to say the iodide of lead iuto the pulp of the paper itself, in the state of most extreme tennity.

The following is the very simple process employed by the inventor, and which gives excellent results. First, preparc the three following solutions:

1st.	Acetate of Lead, nentral...........	300 parts.
	Distilled Water....................	900 "
	Acetic Acid at 10°................	5 "
2nd.	Iodide of Potassium................	300 "
	Distilled Water....................	900 "
3rd.	Sal Ammoniac....................	500 "
	Distilled Water in sufficient quantity to leave a saturated solution at the ordinary temperature.	

Filter the three solutions and keep them in bottles with ground glass stoppers. The solution of iodide of potassium should be kept in the dark. If it should get any way clouded, a drop or two of a solution of caustic potash must be added. Then choose a piece of paper which has been sized with starch and resinous soaps, and by the light of a candle pour the solution of acetate of lead into a flat dish, the solution of iodide of potassium into a similar one, and lastly the solution of hydrochloride of ammonia into another. Near the operator should be placed a large vessel of water which must be perfectly clear and acidulated with a few drops of acetic acid. Then lay the paper on the lead bath, and withdraw it in about five minutes and let it draiu, then place it in the blotting case, to produce an equality of moisture. The sheet may then be laid upon potassium, the side impregnated with the acetate being in contact with the liquid. In four or five minutes, withdraw and let the excess of liquid drain off. The sheet is then ready for nse. For copying any object whatever, we have only to recur to the manipnlations employed in drafting an ordinary positive on paper. Lay the prepared sheet upon some very clean and even black surface, yellow side up ; the object to be copied is laid upon it, and the whole covered with a piece of very cleau thick glass, and exposed to the light.

The time necessary to obtain a good proof, varies according to the object to be copied and the intensity of the light. In the snn an exposure of from one to four seconds is sufficient ; in diffnsed light the time varies from a few seconds to a minute.

After contact with the light the picture is at once visible, but shonld only be examined by candlelight. As with the salts of silver, the action of the light continuing to react upon the surface of the iodide wonld attack the reserves and destroy the proof. The dark parts of the original are copied in a pure yellow on the proof, the white and transparent parts, on the other hand, are green ; the mezzotints are formed by a compound gradation between these two colors. Paper prepared in the above manner retains a certain moisture which is highly favorable; if used dry, a much longer time would be necessary, and the picture would not be as clear. It now only remains to fix the proof, that is to say, to remove its changeable element, iodide of lead. It is evident that this operation must change the color of the proof; all the yellow parts will become white, and the green will verge on a more or less violet blue. The best fixing agent is hydrochloride of ammonia ; immerse the proof in a solution of this salt until, viewed by transparency, the yellow color entirely disappears. Soak it for half an hour in water, so that there may be nothing to fear from the action of light. Hang it up by one corner and let it dry. A thin varnish of gnm arabic does not injure the beauty of these proofs in the least. It also preserves them for the futnre from sulphurons emanations which would otherwise destroy them.

M. Roussin concludes his memoir with several experiments on nentral chromate of potash, bnt the results he has arrived at are far from satisfactory. Chromate of lead, resulting from the action of chromate of potash and acetate of lead, generally presents the reactions of iodide of lead in relation to the colors and the fixing of the proof with the chloride of ammonia.

M. Ronssin invites chemists and photographers to repeat his experiments and pursue the stndy of the phenomena to which he has thus called the attention of savans. D. L.

AN APPEAL TO PHOTOGRAPHERS.

Utica, Augnst 20, 1856.

Friend Snelling,—*Dear Sir:*—It is with much pleasnre that I look back npon the N. Y. S. D. Association, when in a healthy and flonrishing condition. There is no part of my social life which afforded me more real satisfaction, than those hours which we passed at our meetings in rational and nnreserved efforts for each other's good, and the advancement of the photographic art. The free commnnication of sentiments amongst a set of ingenions and specnlative friends, snch as those were, throws the mind into the most advantageons exercises. *In union there is strength.* Association gives strength to onr reason, nnanimity of feeling, and character to our profession. It is not good for man to be alone; the soul when left entirely to its own solitary contemplations, retrogrades and becomes insensible to her sweetest enjoyments. Association opens our views and gives onr faculties a more vigorous play. Union of men nuited in thought and action, is the key to great ends. But why do I again repeat my call to my photographic friends? I have repeatedly nrged my desire and feeble argnments npon them for an organization, but they have heard me not, and my spirit sayeth call again.

I am not so unwise as to expect the proud and noble sons of Daguerre, living in the large cities to rally at my call, yet sometimes the fierce barking of a little spaniel, will aronse the energies of the larger dogs; this is my only hope in this repeated tresspass upon your valuable space and the reader's precions moments. I do not think it my province to make a second advance in forming a national or *local* association of photographists, but my heart, hand and purse is wedded to the noble purpose. If it will not be considered personal, I would like to suggest a few names that I wonld rejoice to see penned to a call for a natioual Photographic Association:—Messrs. Whipple, Masury, Root, Lawrence, Gurney, Brady, and many other gentlemen. You occupy a position which requires you to act first and act fervently, for the advancement of the photographic art. You are located in *the* three great cities on this continent ; you are *the* champions of the art; your efforts have been crowned with success; you have amassed fortunes with yonr cameras; to move without you would surely resnlt unsuccessfully ; but at yonr call, I am sure the enterprise could at once be put in snccessful operation. Why shonld we linger so far behind our brethren on the other side of the water; are we not strong enough in 1856 to keep pace with them. Seventy-nine years ago our forefathers brushed these noses with their bayonets; could we *now* do the same in scientific photography? What proud American watches the advancement of scientific researches and results in Europe, but that when his eye falls upon the pictnre of his own country, he does not blush with shame. Where are our American discoveries in the photographic art? *Hillotyping*, *Ambrotyping*, and *humbugotyping*, to a fearful extent is the grand ultimatum of American discoveries.

But in the time of the revolntion we appropriated Johnny Bull's *Yankee-Doodle*, and so long as we can continue to pilfer a supply of bread ready baked, it may be nnwise for us to study the laws of agricnltnre. I repeat, gentlemen, that we who have less advantages and less means than yourselves, expect yon to go forward in this work, and we in the interior are ready to put our shoulder to the wheel as soon as the word of command is given. The time has come when American photographists are in every way prepared to form a scientific congress or club of some sort, and the general advantages that would be derived from it, would be

felt and appreciated by the whole world. No Hillotype delusion could now impose itself upon us as it did upon the N. Y. S. Association (through a very small and secret orifice); thanks be to *time* (which conquers all), that mountebank has fallen after having fully exhausted the patience and credulity of mankind. There is nothing now to obstruct a speedy and permanent organization, and I hope I may see in the next No. of the Photographic and Fine Art Journal, several plans (from different pens), for organizing an association for the improvement of the photographic art. Whether an organization is affected or not, there can be no loss in discussing the matter.

Very respectfully, yours,
D. D. T. Davie.

ON PHOTOGRAPHY APPLIED TO THE PHENOMENA OF INSANITY.

At the last Meeting of the Royal Society, a paper was read "On the Aplication of Photography to the Physiognomic and Mental Phenomena of Insanity," by H. W. Diamoud, M.D. The author commences by observing that it could never have been expected that a new science would arrive at anything like maturity in the space of fifty years. Yet, with respect to photography, we witness the gratifying fact, that the early labors of Wedgwood, Davy, and Young at the commencement of the present century, have been so zealously followed up, that the fundamental difficulties in the theory of this new science have been overcome, and its practical rules very generally established.

The object of the paper is to show the peculiar application of photography to the delineation of insanity. The investigation of the various phenomena of this sad affliction must ever be highly interesting. The metaphysician and moralist, the physician and physiologist, will approach such an inquiry with their peculiar views, definitions, and classifications. The photographer, on the other hand, needs, in many cases, no aid from any language but his own—preferring rather to listen, with the picture before him, to the silent but telling language of nature.

An asylum for lunatics on a large scale supplies instances of delirium with raving fury and spitefulness—of delirium accompanied with an appearance of gaiety and pleasure in some cases, and constant dejection and despondency in others—or of imbecility of all the faculties, with a stupid look, and general weakness. The photographer catches in a moment the permanent cloud, or the passing storm or sunshine of the soul, and thus enables the metaphysician to witness and trace out the connexion between the visible and the invisible in one important branch of his researches into the philosophy of the human mind. Raving madness is generally accompanied by the forehead being contracted, the eyebrows drawn up, the hair bristled, and the eyeballs prominent, as if they were pushed out of their orbits. Photography as is evident from the portraits which the author exhibited in illustration of his paper, confirms and extends this description, and to such a degree as to warrant the conclusion that the permanent records thus furnished are at once the most concise and the most comprehensive.

There is another point of view in which the value of portraits of the insane is peculiarly marked, viz. in the same effect which they produce upon the patients themselves. In very many cases they are examined with much pleasure and interest, but more particularly when they mark the progress and cure of a severe attack of mental aberation.

After referring in detail to the cases of patients suffering from hopeless insanity, whose portraits accompany Dr. Diamond's communication, the author gives the following account of a case in which photography, as he conceives, unquestionably led to the cure:—A. D., aged twenty, was admitted under his care in August 1854, having been recently discharged uncured from Bethlem Hospital, after a year's residence there. Her delusions consisted in the supposed possession of great wealth, and exalted station as a queen. Any occupation was therefore looked upon by her as beneath her dignity. It was not without great persuasion that this patient was induced to allow herself to be photographed; but when she saw her likeness, and was led to converse on the subject of her delusion, an improvement took place, and she was eventually discharged perfectly cured.

The author conceives that portraits of the insane may be valuable to superintendants of asylums not only for their physiological interest, but also in cases of readmission. It is well known, he observes, that portraits of those who are congregated in prisons for punishment, have frequently been of value in recapturing some who have escaped, or in proving, with certainty and little expense, a previous conviction. In a similar manner, portraits of the insane who are received into asylums for protection, give to the eye so clear a representation of their case, that on their readmission, after temporary absence and cure, the author has found the previous portrait of more value in calling to his mind the case and treatment than verbal description placed on record. In conclusion, he states that photography gives permanence to those remarkable cases which are types of classes, and which are, therefore, of very great interest to the physiologist.—*Saturday Review*, May 24.

From La Lumiere.

ON BENZOIN.

In our last issue we announced the publication of the second volume of "*Lessons in general Chemistry*," by M. Cahours; the distinguished chemist has devoted to photography only a single paragraph (§882) of two pages, in the forty-third lesson, which treats of silver; the oxides, chlorides, salts of silver, &c. There is nothing we can quote from the work on photography, which has not been long known to our readers. We would, however, again call the attention of all those desirous of thoroughly studying the properties and transformations of the chemical compounds employed in photography, to the various chapters in which Mr. Cahours has treated these matters *ex professo*, but they are so numerous we may as well recommend the entire work.

The treatises published by photographic masters, such as Le Gray, Barreswil, Davanne and Van Monckhoven, etc., contain merely a mention of benzoin, the properties and affinities of which should be well understood by those practising heliographic engraving. From these motives, we give the preference to the following chapter from the work of Mr. Cahours on benzoin, which plays such an important part in the new art, on which, in our opinion, almost the entire future of photography depends.

On passing the vapors of crystallized benzoic acid through quick lime or red hot iron filings, this acid separates into carbonic acid and a perfectly clear colorless oil formed entirely from carbon and hydrogen, to which, in order to trace its origin, the name benzoin or benzine has been applied.

This benzoin, whose simple formation may be expressed by the equation,—

$$\text{Benzoic Acid, } C_{14}H_6O_4 = 2CO_2 + C_{12}H_6 \text{ Benzoin.}$$

seems to be produced in numerous ways; we see it formed in the decomposition of fatty substances by heat; in the distillation of coal; in the decomposition of the vapors of alcohol and acetic acid at a dark red heat.

The decomposition of benzoic acid furnishes the most commodious means for obtaining perfectly pure benzoin. For this purpose introduce into a glass retort, an intimate mixture of 1 part benzoic acid and three parts slack lime, and carry to a red heat. Colorless vapors will soon be freed, which may be condensed in a refrigerating receiver. Stir a little potash in the distillation, in order to dissolve the quantity of benzoic acid which may have been carried into the receiver. Then dry the product on chloride of calcium, and rectify with the water bath.

A large quantity of benzoin may also be drawn from the oil of coal tar, by distilling this liquid with the water bath, and setting apart the portions which boil between 80 and 90 degrees. On redistilling, we separate a large quantity of a liquid boiling between 82 or 86 degrees, from which, by placing it in

a refrigerating compound and submitting it to pressure, a considerable quantity of benzoin may be collected.

Iu its pure state, beuzoin is a colorless oil very supple and of agreeable odor; its density is from 0·85 to 15 degrees; the density of its vapor is 2.77; it boils near 82 degrees. Exposed to cold, it takes a crystalliue shape resembling camphor.

Though slightly soluble in water, it dissolves in a heavy proportion in spirits of wood, alcohol and ether. It dissolves sulphur, phosphorous and iodine, especially if aided by heat, and leaves them in the crystal state on cooling and evaporating. It abundantly dissolves fatty and volatile oils, resins, fatty substances and caoutchouc.

This oil is highly combustible, and burns with a fuliginous white flame.

Chlorine and bromiue act rapidly in benzoin, especially under the influence of solar light, giviug birth to crystalline products.

The composition of these chemicals is expressed by the formulas,

$$C_{12}H_6Cl_6$$
$$C_{12}H_6Br_6.$$

Heated with an alcoholic solution of caustic potash it divides, under the influence of heat, into chloride or bromide of potassium and new chlorated or bromenized compouuds. These transformations are expressed by the equations.

$$C_{12}H_6Cl_6+3(KO, HO)=3 K Cl+6HO+C_{12}H_3Cl_3$$
$$C_{12}H_6Br_6+3(HO, KO)=3 K Br+6HO+C_{12}H_3Br_3$$

Concentrated sulphuric acid dissolves benzoin and produces a copulated acid capable of forming with the bases definite and crystallizable acids. Fumiug sulphnric acid gives birth to the same product, it forms at the same time a neutral substauce to which the name of *sulpho-benzide* has been applied.

These compounds are represented by the formulas:

Sulpho-benzodic acid; $C_{12}H_8S_2O_6$
Sulpho-benzide; $C_{24}H_{14}S_{12}O_4$

Fuming azotic aeid converts benzoin into a heavy liquid, boiling at 213°, and possessing an aromatic odour resembliug bitter almonds, to which the uame of *nitro-benzoin* has been given. This substance is used in perfumery under the name of *essence de mirbane* as a substitute for the essence of bitter almonds. Boiling benzoin for a long time with fuming uitric acid gives birth to crystals which are designated as *binitro-benzoin*. The latter is easily obtained by pouring benzoin drop by drop into a mixture of fuming sulphuric and nitric acids, and then heating for a few minntes. On diluting the acid liquid, flakes seperate which are purified by washing and crystallization iu alcohol.

The formation of these two compouuds may be explained by the two equations.

$$C_{12}H_6+Az\ O_5,\ HO\ =\ 2\ HO+C_{12}H_5\ (Az\ O_4)$$
$$C_{12}H_6+2Az\ O_5,\ HO\ =\ 4\ HO+C_{12}H_4\ (Az\ O_4)2.$$

These nitrated compounds being heated with an alcoholic solution of hydrosulphate of ammonia, are transformed into aniline and nitraniline. These reactions are often put to profit to discover small quantities of benzoin.

Nitro-benzoin being mixed with an alcoholic solution of potash, the liquid becomes very hot and assumes a brownish tint. On cooling it deposits brown crystals; the supernatent liquid being submitted to distillation, soon divides into two strata; the upper, oily, of a brown color, concretiug into a mass of needles; the lower is a solution of caustic potash, carbonate of potash, and another salt of this base, in alcohol and water.

The preceding crystals being purified by solution in alcohol and crystallization, show themselves under the form of brilliant yellow needles, fusible at 36 degrees. This product is knowu under the name of *azoxy-benzide*, its composition is represented by the formula:—

$$C_{24}H_{10}A2_2O_2$$

It crystallizes in brilliant, sulphur yellow quadrilateral needles, which are somtimes an inch long. It is hard, inodorous and insipid, insoluble in water, but soluble in alcohol and especially in ether. It melts at 36 degrees, and on cooling, forms into a radiate mass.

By submitting this snbstance to dry distillation, it divides into auiline and azo-benzide, whicb may be separated from eacb other by an aqueous solution of hydrochloric acid whicb dissolves the aniline and leaves the azo-benzide intact. This latter substance presents itself in the form of beautiful reddisb yellow spaugles, little soluble in water, but higbly so in alcohol. It melts at 65 degrees and distils at 193 degrees, withont undergoing the slightest change.

The hydrosulphate of-ammonia easily rednces it and transforms it into an alkaline substance to which the uame of benzidiue is given, by only differing therefrom by 2 equivalents of hydrogen at the most.

The composition of azo-benzide being in fact expressed by the formula:—

$$C_{24}H_6Az_2,$$

and benzidine by—

$$C_{24}H_{12}Az_2.$$

The composition of benzoin is represented by the formula:—

$$C_{12}H_6\ =\ 4\ \text{vol. vap.}$$

SUGGESTIONS OF SUBJECT TO THE STUDENT IN ART.*

BY AN OLD TRAVELLER.

CHAPTER VII.

Confessors of the early Church—Vivia Perpetua—Rennnciation of the God—A General of other days—Brasidas at Methoue—The Fort of Pylus—Sea-fight—Fall of the leader—Vows to Minerva—Crowned at Scione—Death at Amphipolis—General Wolf—Marquis of Montealm—Riehard the Good—Spirits appellant—The Duke's decision—The offender cited—Miracle—Varied views—"The Water Lady"—Harvest-time—A eity in the waters—The Proteetor—A republiean envoy—Royalty and its defenders—Spanish fashion under Philip IV.—A statue in speetacles—Color, or the marble?—Venus Victrix—The nymph and the god—An Oread—The Pleiad Maia—The Camena—Hesiod.

To the reader of early Christian history, the touching story of Vivia Perpetua is well kuowu; her life was made familiar to a yet wider circle, some years since, by the admirable drama of a writer too early lost to the world of letters:† but lest there should be some among our readers not yet acquainted with it, the mere facts shall be related iu a few brief words.

Dwelling with her family iu Carthage, but of Roman descent and nobly-born, Vivia Perpetua has been converted to the Christian faith: this is discovered by her father, by whom she is at once denounced to the priest of Jupiter: he furthermore drives her from his home in implacable displeasure, and she is thrown into prison. Here every effort is made to win her back to the rites she had abandoned, but all are vain: in her prison she becomes the associate of slaves, but her Christian faith has taught her to consider these, not as beiugs of an inferior order, as inculcated by the code of the heathen, and as she once believed, but as fellow-creatures, to whom the common rights of humanity are due, even as to herself: nay, when ultimately condemned to death, it is with one of the despised race, formerly a slave of her own, that Vivia Perpetua advances to meet her fate.

But first the noble convert has repaired in silence and loneliness to the Temple of Olympian Jupiter—of that idol whom, in other days, she devoutly adored—her purpose, to reuounce her allegiance to the false god. And here, O Sculptor, bave you, uo less than the Painter, a subject worthy of your utmost devotiou. Eveuing shades are falling, the great and sumptuous fane is solitary, save for the one figure, deeply mournful, though firmly resolved—the once pious votary, who has sought the shrine for sucb unwonted purpose. Majestic in its sonl-given force is the form, and beautiful in holiness is the face of her now solemnly raising abjuring hands towards the deity so long re-

* Continued from page 240.
† The late Mrs. Adams.

vered. She is not kneeling—that day has passed; firmly, yet with no arrogance of mien, she stands before the abandoned altar, and these are the words she utters:—

„ Lo! where all trembling I have and prayed,
Where vow and sacrifice at morn and eve,
Shrouded in incense dim, have risen to appease
The wrath, great Jove, of thy once dreaded thunder—
Up to the might of thy majestic brows,
Yet terrible with anger, thus I utter:—

" I am no longer worshipper of thine!
Witness the firm farewell these steadfast eyes
For ever grave upon thy marhel front;
Witness these hands—their trembling is not fear—
That on thine altar set for evermore
A firm renouncing seal—I am a Christian!
* * * * *

" The shadows blacken, and the altar-flame
Troubles them into motion—god of stone,
For the last time, Farewell ! " *

This for the Sculptor more especially—yet the Painter can scarcely do better than choose it also; and the rather as there is no impediment to his reproduction of Olympian Jove in all the pomp described by Pausanias. The grandeur of fine architectural effects—the awful presence of the Sphinxes—the imposing aspect of the Victories—the varied beauties of the Olympian gods, richly clustering around their chief—the inspiring loveliness of the Graces and the Hours, are all for him: nay, the ebony and ivory, the gold and the precious gems, also lending their aid to enhance the effect of the gorgeous whole, are not forbidden to his pencil, although the Sculptor must feel restricted to a much less complete exposition of the eloquent historian's lifelike picture. But leaving these questions, and returning for a moment to Vivia Perpetua—the drama that is to say—it may perhaps be not out of place to remark that there are many other studies, whether for the Painter or the Sculptor, within the comparatively few pages of that graceful work, and the votaries of either art would do well to accept the inspiration, breathing its salutary influences from so pure a source.

It cannot be but that some one or more among the youth of our Studios will be turning their attention to themes of war for some time to come—the declaration of a paper-peace notwithstanding; and here is a General whose life will supply them with many a fair theme.

The Lacedemonian, Brasidas, is the commander in question, and some portion of what Thucydides has related of his noble deeds, is briefly transcribed below; but whosoever shall determine to make the glorious history of the Spartan the subject of his meditations, must turn to the pages themselves, and to these, with that understanding, we propose to refer as we proceed.

Thus it is then that our historian—who, be it remembered, was an Athenian, the contemporary, the opponent in arms, and, in so far, the enemy of Brasidas—first speaks of the Lacedemonian general, by whom Athens was so effectually kept in check even to the close of his life: nay, by whom her predominance was all but entirely destroyed—since it was the untimely death of Brasidas which alone saved Athens from certain, if not immediate, subjugation.

The Athenians, with the Corcyræans, had effected a landing at Methone, in Laconia, and were assaulting the city, which was wholly unprepared for defence; of this event it is that Thucydides speaks as follows:—

" Now Brasidas, the son of Tellis, a Spartan, happened to be in command of a guard for the defence of those parts, and on hearing of the attack, he came to the assistance of those in the place, with a hundred heavy-armed. Dashing therefore through the army of the Athenians, which had its attention directed towards the wall, he threw himself into Methone." It is true that he lost some few of his own men in thus entering Methone, but he saved the city, and for this daring deed "he was the first to receive public praise at Sparta in that war."† Here then you have the first of your pictures from the life of Brasidas.

Wise in council as brave and ready in arms, we next find our Spartan hero dispatched to Alcidas, the Lacedemonian admiral, whom he greatly assisted in the preparations then making against Corcyra.‡ Subsequently we have the discussion of an event, which, in the dearth of all movement now suffered by the painter of sea-fights, can scarcely fail to rivet his attention: we allude to the part taken by Brasidas, in the renowned attack on that fort erected by the Athenians at Pylus. Let us hear what Thucydides says concerning it.

Encouraged by a most inspiring speech from their commander, Demosthenes—for which I refer you to the author—the Athenians were well prepared to receive their enemy, when the Spartan ships—of which there were forty-three, their admiral being Thrasymelidas, the son of Cratesicles—advanced to the attack. " So the Athenians defended themselves on both sides, landward and seaward, while their opponents, divided into detachments of a few ships each, because it was not possible for more to bring to, came against them with all eagerness and mutual exhortation, each seeking if by any means he might force the passage, and take a place in the fight.

" But the most distinguished of all the Spartans was Brasidas; for, being captain of a trireme, and seeing that in consequence of the difficulty of the position, the captains and steersmen, even where it did seem possible to land, shrunk back and were cautions of wrecking their vessels, he shouted out and said, that it was not right to be chary of timbers, but he bade them shiver their vessels rather than fail to force a landing. The allies of Sparta he exhorted not to shrink from sacrificing their ships, in return for the great benefits they had received from the Lacedemonians, but to prove their gratitude on the present occasion, and run their ships ashore, so as to land by any means, thus securing both the men and the place.

" In this way did Brasidas urge on the rest, and having compelled his own steersman to run the ship ashore, he stepped on the gang-board, and was preparing to land, but before he could wholly effect his purpose, he was cut down by the Athenians. It was not until he had received many wounds that Brasidas fell, but at length he dropped fainting into the ship's bows, his shield at the same moment slipped from his arm into the sea, when, being thrown ashore, it was secured by the Athenians, who afterwards placed it conspicuously on the trophy they erected."

Ships from Zacynthus reinforced the Athenians, and the Spartans were compelled to retire; but if Brasidas had not secured success, he had done more—as we have high authority for declaring—by so effectually deserving it, wherefore let this event also find place on your canvas.§

Recovered from his wounds, Brasidas next proceeds to Megara, which he saves, not from the Athenians only, but from the fatal irresolution of its own citizens, and from the consequences of the factious struggling and intriguing of parties, each for itself, within the walls. He then makes a rapid march through Thessaly into Thrace; and at a later period of the war, it was the probity and ability of Brasidas that most availed to detach from the Athenians the best of their allies, and to win over to the Lacedemonian interest the cities thus estranged. Of this fact the wise counsels offered to Perdiccas, at the Pass of Lyncus, shall suffice as proof: by his own steady persistence in acting on the principles announced in these councils it was, that Brasidas ultimately succeeded in detaching the King of the Lyncestian Macedonians from his alliance with Athens, a most important advantage to the Lacedemonian cause.‖

For the admirable oration of Brasidas to the Acanthians, I

* With the somewhat illogical character of the act recorded in these graceful words, it is not lawful for us to cavil; we are to leave that ungracious task to the critic, in whose darksome life the detection of a spot on the sun serves for light and gladness: sufficient to us shall be the *picture.*

† See Thucydides' " History of the Peloponnesian War,' book ii. The translation used by the present writer is that of the Rev. Henry Dale, made from the text of Arnold.

‡ Hist. Pel., *ut supra*, book iii. 11, 12.

§ For minute details of all these things see Thucydides, vol. i., book iv. 2—15.

‖ Hist. Pel., book i. v. 83–84.

refer you to the author;* his surprise of Amphipolis, must also be passed over; but your conception of our hero's exalted character may be aided by the recollection that his clemency to the Amphipolitans caused other cities, previously in the alliance of Athens, to send messengers desiring the protection of Brasidas. It was thus that the Spartan obtained possession of all the towns in the territory called Acte—Sane and Dium alone excepted.

Torone he brought over to the Lacedemonians in like manner, and in like manner were the inhabitants conciliated by the wise measures of Brasidas. To Lecythus he granted a truce of two days, when one only had been demanded by the citizens for the burial of their dead. Devout as brave, the Lacedemonian general had no sooner captured the city, than he commanded a large sum of money should be presented to the Temple of Minerva—that goddess having, as Brasidas believed, secured his success by causing the fall of a formidable tower, erected by the defenders to oppose his progress; and in further proof of gratitude, the whole site was declared to be sacred when the city of Lycthus had been razed to the ground.

Having compelled the Athenians to accept a truce, the following clause was inserted among others, by the influence of Brasidas, and may further help you to a clear appreciation of the piety, integrity, clemency, and moderation which he joined to his other great qualities as a general:—

"With regard to the temple and oracle of the Pythian Apollo, we agree that all who desire access thereto may be permitted to have it, without deceit and without fear, according to the laws of our several countries. The Lacedemonians, and such of their allies as are present, agree to this, and declare that they will use their best efforts to persuade the Bœotians and Phocians to do so, by heralds sent for that purpose, proceeding uprightly in respect to the treasures of the god, and acting in accordance with the laws of our respective countries."

At Scione the same policy produced similar effects; and here Brasidas, having convened an assembly of the people, did so effectually win their hearts, that a crown of gold was decreed to him, as to the liberator of Greece. This was conferred on him publicly with other marks of honor, and you can scarcely do better than exhibit to us his fine face and noble figure, as he stands amidst his glad compatriots, expecting the glorious tribute about to be placed on his brow by the Scionæan archons.

Of his advance on Potidæ, and much besides, we must be silent for lack of space; proceeding to give a brief account of his glorious death in the arms of victory, and refraining from the reproduction in this place of more than a very few words from the commencement of his address to the troops, when leading them, for the last time, to meet Cleon, the general of the Athenians.

"Men of the Peloponnese, with regard to the character of the country from which we come—namely, that by its bravery it has always maintained itself a free country, and that you are Dorians about to engage with Ionians, to whom you are habitually superior—let a brief declaration suffice."

He then proceeds to give good reasons for confidence, exhorts all to their duty, affirms in very few words his own readiness to do and dare, as he advises other to do, and ultimately marches at the head of his troops.

But the descent of Brasidas from Cerdylium—where he had taken up his position—could not be made without attracting the attention of his antagonist, Cleon, the general of Athens, whom he found prepared to receive him. The Athenians were routed nevertheless, and it was while harassing their retreat that Brasidas received a mortal wound, and fell dying to the earth. Taken up by certain soldiers of the Chalcidian horse, he was "carried, still breathing, into the city (Amphipolis), where he lived to hear that his troops were victorious, but expired after a short interval."

"He was buried, at the public expense; in front of what is now the market-place. All the allies attended in arms; and the Amphipolitans, having enclosed his tomb with a fence, having ever since made offerings to him as to a hero, giving him the honor of games and annual sacrifices."

"The Athenian commander, Cleon, was also killed in this battle—or rather was slain, as he fled, by a Myrcinian targeteer."†

You will all be reminded of our own general, Wolfe, by more than one passage of the life of Brasidas: the death of each in the arms of victory carries on the parallel, while the fall of the English commander's noble antagonist, the brave and accomplished Marquis of Montcalm, is represented, in a certain sort, by the fate of Cleon.

Of the various points of time proper to your purpose, each will judge for himself; the costume, in all its details, in sufficiently familiar to all; the form of the ships, more especially that of the trireme, is known to every schoolboy, and needs no description.

Among the "Judgments of Richard the Good," as set forth in the quaint old Norman French of Wace, many a curious scene of varied interest will be found; now full of a racy humor, and anon most deeply pathetic. You will find more than one instance of both kinds in the "Romance of Rollo:" here, for example, is a narrative that may be translated something after this wise.

Now there sped forth a certain monk on an evil errand: he looked behind him fearfully as he left the abbey-gate; but there was none to espy his purpose, and noting this, with heart well satisfied, he passed joyfully on his way.

One step followed fast on another, and the wayfarer came to the brink of a river. Yet the waters, though roaring angrily, do not stop him; he crosses deftly by the bridge, until he comes to the midst thereof, then did there open to him a chasm, which he had not marked till the yawning mouth received him, and the monk sank drowning in the torrent.

Thereupon came the devil, who had gone with him step by step, though he wist it not: he now draws the soul from the body of that monk, and is bearing it to a fiery dwelling; but the sinner's guardian angel rushes to earth, and requires the fiend to resign his prey.‡

"Herein you do me wrong," remonstrated Satan, "for I found this monk on an evil path, and he belongs to me."

"Not so," replied the angel; "since he was only on the way, and might have returned, repenting him of his intent."

"Nay, but he is mine of right," insisted the demon; "seeing that this was not the first of his journeys in the direction you wot of; and even as he fell into yon wave, was that sinner meditating a return on the morrow, should the continued absence of his superior afford him occasion."

"Touch him not, for all these things," rejoined the guardian spirit; "neither will I take him—but let us bear him to Richard the Good; he shall judge between us, and by his judgment will we abide."

"Thou hast said well," assented satan; and keeping the soul in their charge, vigilantly watched between them, the Spirits of Light and Darkness repaired to Richard: they found him sleeping in his bed, but he aroused himself to hear them.

Their story told, the good duke declares that neither shall have the soul, which he bids them return to the body, commanding them to place the monk on that precise spot of the bridge whence he had fallen, but by no means to let the chasm opened in the midst thereof be apparent to him.

"If then he take but one step on his evil path," continued the upright judge, "he is thy property, O Fiend of all mischief—take him and work thy will: but if he turn him from his purpose, let him depart in peace—so may thine hour to claim him, fair Spirit of Light, be yet permitted to come."

This being done as commanded, the monk made no further step towards the misdeed he had meditated, but hastened back to his cell; the Spirits also went their way, each to the work appointed them.

* Thucydides, book v. 85.—87.

† Hist. Pel., book v. 10, 11.

‡ An incident of closely similar character is related by Dante. See the "Purgatory," canto vi.

Passing over the contention of Satan with the guardian angel, —as already sufficiently indicated when discussing the before-mentioned passage from Dante,*—let us consider if there be not the elements of a picture, in the audience accorded by Duke Richard to his remarkable clients, as described in the story. The rude walls of the good duke's chamber, the unglazed aperture preceding the window of a later period,† giving ample views of the country without, may serve for background. Before them is the simple couch whence he has just risen; his tall stature and large form, with the rich fair hair and clear blue eyes, all common to men of the Gothic race, are well contrasted by the delicate beauty of the ethereal spirit, and by the dusky, yet also beautiful presence of the fallen angel; while the shadowy appearance representing the soul of the monk, will serve usefully to exhibit that mastery over his art which we are surely not wrong in attributing to that one among our youthful painters who may take this work in hand.

A second picture, from the same source, might show us Richard the Good when, repairing on the following day to the abbey whence our monk had attempted the notable escapade recorded above,—and to which the latter had returned *tout penaud,* as aforesaid,—he requires that erring brother to appear before him.

This the poor monk is compelled to do. But see the miracle! his habiliments are pouring streams from the river as he walks—they threaten to inundate the church wherein our present scene is laid; for these garments cannot be dried until the culprit hath made confession of his fault in the presence of all his brethren. Here, then, we have him constrained to perform that penance, and he is opening a rueful mouth for the purpose, to the boundless terror and amazement of the simple-looking old abbot, who is standing with his attendants near the duke.

But there are other and differing expressions in the faces of the brethren scattered at intervals about the choir. One stands rooted in holy horror; others exhibit varying emotions; some would fain look more shocked than they feel, if they knew how to set about it; while some few, and they not far from the abbot either, 'tis sorrowful to say, have the air of men who could very easily look as much amused as shocked, did the presence wherein they stand permit the free expression of their feelings.

Has any painter reproduced on his canvas the pictures originated by Hood in the verses that follow? It would seem to be impossible that they should have escaped the notice of artists; yet we do not remember to have seen a work on this theme in any one of our exhibitions—neither have we remarked designs from it in the various portfolios that have been from time to time permitted to our inspection. Be this as it may, here are the lines in question:—

THE WATER LADY.

"Alas! that moon should ever beam
To show what man should never see:
I saw a maiden in a stream,
And fair was she.

"I staid awhile, to see her throw
Her tresses back, that all beset
The fair horizon of her brow
With clouds of jet.
* * * *

"I staid to watch a little space
Her parted lips, if she would sing;
The waters closed above her face
In many a ring.

"And still I staid a little more;
Alas! she never comes again.
I throw my flowers from the shore,
And watch in vain.

"I know my life will fade away—
I know that I must vainly pine;
For I am made of mortal clay,
And she's Divine."

It will not greatly task your ingenuity to find much more than meets the ear in the fanciful and beautiful verses just recited. Hear also the following—they transport you to a wholly different region; but in every clime the fervid hours of these glowing harvest-days invite to the reproduction of the charming picture presented by them. Make no delay—such skies as these do not always light our goodly fields, even when the rich amber of their abundant harvests waves over them in changeful hues, as now. Let the painter take his picture while he may, then; so shall many rejoice in the gladsome brightness of its fair being, even when the hoar days of winter are upon us. Place! ample and honored place, for the lovely scene and its lovely occupant, as the poet has set them before us:—

RUTH.

"She stood, breast-high, amidst the corn,
Clasped by the golden light of morn;
Like the sweetheart of the sun,
Who many a glowing kiss had won.

"On her cheek an autumn flush
Deeply ripened—such a blush
In the the midst of brown was born,
Like red poppies grown with corn.

"Round her eyes her tresses fell,
Which were the blackest none could tell;
But long lashes veiled a light
That had else been all too bright.

"And her hat, with shady brim,
Made her tressy forehead dim.
Thus she stood amidst the stocks,
Praising God with sweetest looks.

"Sure, I said, heaven did not mean,
Where I reap thou shouldst but glean;
Lay thy sheaf adown, and come,
Share my harvest and my home."

A pleasant town is the Hague, always providing, and be it hereby enacted, that none but the worst of men shall be compelled to remain within the somewhat level precincts thereof—save "during pleasure." Let him who, not being in the above-named category, finds his patience early washed out of him by the watery influences of the place, have permission to depart, but not until he hath painted—for my rule extendeth only over such as take pencil and pallet in hand—not, I say, until he hath painted for me some features of the following incident. The facts were related to the writer in the year 1841, by one whose ancestor of the period had taken part therein.

During a portion of that time when Oliver Cromwell made the name of our country to be respected in all lands—accuse him who will of his *forfaits* and *mefaits*‡—the stern republican St. John, a man of haughty and repulsive manner, held the post of English plenipotentiary at the Hague. At the same time it chanced that the Duke of York, who had found refuge in Holland, was one day pacing sadly along the public walk, when he was observed by Mr. St. John; and the latter, needlessly changing his course, to the surprise of certain persons with whom he was conversing, took pains to cross the path of the duke, at whose downcast features he looked half-contemptuously as he passed, but without eliciting the slightest remark from the prince, who, absorbed in his reflections, did not appear to perceive the interruption.

Arriving at the place of departure as the duke was leaving the walk, Mr. St. John rudely stepped forward, and, with his hat on his head, took precedence—James of York modestly drawing back as he became aware of the Englishman's intention, but with an expression of astonishment at the discourtesy of his uncalled-for intrusion.

The Prince Palatine, who came up in time to see what was

* See *Art-Journal* for April of the present year, p. 104.

† It is true that glass had been then used for some time by the more luxurious of the Norman great; but Duke Richard had been reared hardily, and taught to hold such indulgence in contempt.

‡ Speaking of the Protector's funeral, Evelyn says, "This was the merriest funeral I ever saw; no one howled but the dogs, with which the soldiers made barbarous sport."

done, instantly lifted off Mr. St. John's hat with his cane, remarking, with pretended politeness, but with a manner which he took care to make sufficiently significant, that the English ambassador had failed to perceive the presence in which he stood.

St. John felt the sarcasm, and laid his hand on his sword, but disproval of his unhandsome conduct was written in all faces; every man of distinction there present gave point to the reproach by standing respectfully uncovered, and with more than ordinary observance, around the prince, and as in attendance on his person. The populace, taking part with fallen royalty, began to express their opinion in tumult; the harsh republican was driven ignominiously from the grounds, and, after being for some time in imminent danger of his life, was glad to accept the protection of the very man whom he had sought so needlessly to offend, and took refuge in the duke's lodging.

The scene of this incident was that really beautiful promenade known to all visitors of the Hague as the *Bosch*, or Wood. Magnificent trees are found at intervals throughout the not inconsiderable length of the space; and these, however short may have been your stay in Holland, you will have learned thoroughly to appreciate; deep shadows fall over bright green slopes, their exquisite color making large amends for that lack of boldness which the nature of the surface renders inevitable: handsome sheets of water vary the character of the whole. If to these be added the widely differing appearance of the personages forming your chief group, the diversified expression proper to each of the actors; to the nearer bystanders, and to the more distant people,—now preparing to repay the discourteous ambassador in his own coin, as exhorted thereunto by the energetic fishwoman of Scheveningin, conspicuous by her shadowy head-gear, and coming prominently forward in their foremost ranks,—you will at least not fail of variety in your picture, and may produce a work of which the interest will certainly not be inferior to that of many now occupying space on the wall of our galleries.

When the brilliant courtiers of Philip IV. of Spain did not venture to gaze on his august countenance until they had first mounted spectacles,—" broader," says the Countess D'Aulnoy,* " than the palm of my hand,"—a certain marquis, first among the foremost, and who would assuredly not fail to have his glasses of the orthodox amplitude, was pleased to command the erection of a statue to his own honor and glory.

And the sculptor completed his work; but, strange to say, he neglected to place marble spectacles on the nose of the marble hidalgo, and was forthwith " turned back," as schoolboys have it, to supply the omission. Of his ultimate success the chronicles do not speak: but that the Marquis of Astorga's effigy was duly furnished with spectacles we may not doubt, although no statue exhibiting such appendage hath met the pen of the writer. In any case, would not the Spanish amateur prove the most zealous of patrons to that sculpture in colors, now menacing ruin to the noblest of the Arts ? How would he rejoice in the brilliancy that might now be given to the velvet of his habiliments! how glory in the dazzling glitter that would now be imparted to every jewel in all his orders! Alas for the Marquis of Astorga! why did he live so long before the time ? —for do but think of the rare delicacy with which we could now reproduce, for his delectation, that refinement of complexion which it is but civil to conclude that he derived from his indubitable *sangre azul*—the unquestionable " blue blood" of his race!

But the subject is after all scarcely fit to be laughed at—nay, rather, since this deplorable innovation is to a certain extent sanctioned by an authority so much respected as is our admirable Gibson, are compelled to treat it with the utmost seriousness. Not that all one's admiration for the artist can blind one to the fallacy of his reasonings on this subject; nay, even while listening to his zealous defence of the new theories—or newly revived, for we do not here enter into any discussion of that question—you feel more than ever rooted in your attachment to the old ones. The delicacy and reserve with which the Sculptor has applied his theory to practice, in such specimens of the new manner as we have seen in his Roman studio and other places, could not render us unfaithful for one moment to our earlier loves among his previous works; on the contrary, the grace and beauty of these last caused us ever more to lament that the earnest speaker should be disposed to adopt a manner which, with all due deference to his judgment, we could not but think a mistaken one, both for his own fame and the future delight of the world in his works.

Among the first of his productions treated by Gibson in this new or newly-adopted manner, was a statue of the Venus Victrix,—if we remember rightly,—the apple lying at her feet, involved—if our memory do not fail us—amidst the gracefully depending folds of her drapery. That the beauty of the work was not impaired so seriously as we had feared it would be, is a fact not to be denied, and which we distinctly remember. Yet did we return with increased delight to those chaste forms of the artist's early day, all but breathing around us, and seeming to reproach their creator for his abandoment of that happier phase in his and their existence, when he had called them into that lovely life, from the cold insensate blocks of their else unmarked abode; we returned with even new delight, I say, to those earlier works; and when reluctantly leaving them, after long and repeated contemplation, it was with the conviction fully confirmed that Sculpture, as the great old masters presented her to the love and worship of all times, late and early, does indeed need nought from the "foreign grace of ornament," but *is*, " when least adorned, adorned the most."

If then there be any among our aspirants doubting whether it be desirable to adopt the new method, let him be assured that color is not for the purposes of the Sculptor; for since, even in the hands of Gibson, the addition, though admitted only with the utmost reserve, and applied with an exquisite delicacy, is yet no improvement—to use the gentlest form of phrase permitted by truth—what would you look to find it in hands less competent, under treatment less refined? Do not your most cherished recollections combine to warn you of the perilous venture! would you suffer a pair of blue eyes to glimmer from beneath the veil of Vesta? or have you any mind to affix black locks to the head of Apollo Delphicus?

I know it may be said that no such enormities are contemplated; well, they are not: but beware the sharp end of the wedge, never does it fail to bring the broard one in its train, and be sure that a law so general will be held inviolate, here as elsewhere.

Do you then hold fast to the practice as it has been, whether that be of the oldest or not; evoke from the willing stone those proud and beauteous forms wherewith your imagination is doubtless ever teeming, but eschew the desecration of color; let the Marquis of Astorga rejoice in the glories thereof, with those of his spectacles, if so it please him, but do you content yourself self with the purity of the marble.

Here, for example, is a group which would by no means be embellished by color; you will find it in some one among those masses of marble awaiting the moment of inspiration in the recesses of your studio—provided only you do not seek it until the propitious day has dawned upon you. One of the loveliest of the Corycides is that nymph with her sweet, imploring looks, and graceful attitude of such entreaty as one immortal may address to another.†

She has risen to a certain height on the sacred mountain, at the foot whereof is her birth-place, and meets Apollo Ismenius, as he descends to that temple of Bœotia whence the name he bears. The god is looking with approval on her beauty, as you see well, and she beseeches him to endow the lyre in her hands, and which she holds towards him, with such perfection of tone as may render it worthy to sound his praise. That Apollo will grant her prayer is made manifest by the expression on that god-like brow, and on the fine arch of his lips; but let there be

* See " Voyage en Espagne," Lettre viii.

† If the nymphs are not immortal, in the strict sense of the term, they are sufficiently so for the purposes of the artist.

no rumor of color in the air, lest your visitants, seeking defence from that outrage to their divinity, should return to their refuge in the sheltering stone.

Or say you give us the fairest of the Oreads, as she prepares to join in attendance on the Delian huntress; beautiful are the free limbs appearing from beneath her high-looped tunic; full of spirit is her action, as, holding the well-filled quiver in one hand, she throws its fillet over her firm and rounded shoulder with the other; her bow, which she will presently resume, laid beside her on the earth. Elastic will be the bounding step of the Oread on the dewy glades she prepares to traverse, and gladsome is the expression of the full but sweet and chastened lips, half opening as about to give utterance to the joy of her heart, as the sports awaiting her rise, with all their genial delights, to her thought.

Or suppose you take the brilliant Maia for your theme: whether, as the most luminous of the Pleiades, you present her alone and star-crowned, or, approaching her as one of the Camenæ,—all but immortal,—you engage us to wait reverently and in silence while her votaries offer sacrifice. And these last, should your intent be the more ambitious one, will aid you effectually to form such a group as might be worthy of a temple fairer than aught now reared by man. For in this case you will invest the daughter of Atlas with her most imposing dignity, and the shepherd about to present his offering must exhibit all the perfection of youth, strength, and beauty. The victim offered may be a kid, sporting playfully with the flowers that mark his doom; or a lamb, caressing the fingers that have bound him for the sacrifice. Or, if you hold them more appropriate, let your shepherd-boy bring flowers only, or the produce of his hives instead—since of these, or of gifts yet more simple, were the offerings most commonly made to the nymphs.

Yet I incline for this occasion to the more important offering, for see, there leans upon the shoulder of the youth, a man whom age, or some malignant influence, has robbed of his pristine force, it is for him that the boy implores the favor of Maia—and affection offers no niggard gift. It may perchance be length of life that the elder votary seeks at her hands, and in that case he would make ample sacrifice, attributing to the Camenæ such power to prolong the days of her worshipper as might content the desires of him who best loves life since he knows that she may confer any length of existence short of that accorded to herself; and of this, what says Hesiod, or rather, what sing the swains to whom he listens when the flocks are in the fold;—

"Nine times the life of the oldest man have the gods assigned to be the life of the Crow; four times longer than the crow lives the Stag; three times the life of the stag is that of the Raven, and ten times do the Nymphs outlive the Phœnix." The boon our shepherd is asking may be thus of no trifling moment, and in proportion must be the sacrifice, but not even here must you endure the presence of color—no, not though it were but to lend the faintest of hues to the smallest of blossoms that your votaries have twined around the neck of their offering.

From the Jour. of the Phot. Soc.

PHOTOGRAPHIC FORMULÆ.

To the Editor of the Photographic Journal:

Sir,—Might I venture to suggest that much gain might accrue to photographers in general, were a Committee formed to draw up a *really* useful and practical set of photographic formulæ, a sort of Photographic Pharmacopæia, if I may be allowed the term. The numberless, recipes that appear from day to day, appertaining to the various processes reecommend, are necessarily most puzzling, especially to beginners in the art; and although there is no lack of maunals of instruction, and many of them most excellent in their way, still there *is much wanted* a really good selection, made by some practical person, of photographic formulæ, which might serve as a text-book both for the beginner and the more advanced student. It need advocate no particular system, need give no detailed account, but consist solely of a well-selected set of formulæ for the various processes. I really think, with submission, that the idea is worth the consideration of a Society instituted for the furtherance and elucidation of this facinating pursuit.

Before closing this brief communication, I would wish to inquire if any of my brother photographers have made, experimentally, any inquiry as to the various states of the atmosphere, favorable, or the reverse, to taking photographic pictures, more especially in reference to the *polarizing* effect of the sky on some days, and the absence of this effect on others? On the former, pictures, at least *good* portraits, even in the open air, can with difficulty be taken, although no unusual appearance would be remarked by an ordinary observer: such days would also prove bad ones, at least slow ones, for copying; still by the simple use of a tourmaline, on finding such polarizing effect to exist, the operator need not be disappointed if he do not obtain the good results he expected. I many months ago addressed a letter to the Editor of 'Notes and Queries' on the the same, hoping that it might elicit some remarks from gentlemen much more competent than I am to experimentalize on this exceedingly interesting branch of science, and in my opinion a very legitimate one, as applied to photography. By the simple instrument that I described in 'Notes and Queries,' much disappointment may be saved, especially to those amateurs who busy themselves with portraits. I shall be very glad to hear the opinion of any of your readers on this subject.

I beg to remain, Sir, truly yours,

J. W. Gutch.

NOTES OF A TRIP TO EUROPE.—No. 7.

Friend Snelling,—Although it was after midnight when I arrived in Rome, I was up by daylight the following morning, and it was some time before I could realise the fact that the long cherished wish of years was gratified, that is was no dream but a reality, that I stood within the walls of the once proud mistress of the world; but now, alas! how fallen.

"The Niobe of nations! there she stands,
Childless and crownless in her voiceless woe,
An empty urn within her withered hands,
Whose holy dust was scattered long ago."

If on my awakening I had the least doubt of my whereabouts I soon had convincing proof of the locality, for during the night I had kicked off the bed clothes, thus giving the Ancient Romans a chance to make my acquaintance, and I can assure you they were nowise backward, and if you could have seen my extremities you would have pronounced it a severe case of small-pox. I am free to say, of all the places I have yet visited it is the one to enjoy a flea bite to perfection. While breakfast was being prepared I strolled forth, so impatient was I to tread the streets of the "Imperial City." I found my quarters the "Hotel Allemand," kept by Frank Roessler, (who by-the-way, is a fine fellow, and if any of your friends visit these parts, I would advise them to make his acquaintance His house is situated in the Via Condotti, close to the Piazza di Spagna, where are a number of the principal hotels.) On my return to the hotel I found a *valet de place* waiting to offer himself; he was quite intelligent looking, and being prepossessed in his favor I took him into my service. I despached my breakfast hastily, and then repaired to the American Ministers' to see if there were any of my countrymen in Rome that I knew; not finding any, I started off to commence my explorations of the ruins and works of art. My guide wished to know what I would see first, I told him St. Peters; to lead the way, as we would have to go on foot, and hinted that a carriage would be extravagant for so small a party, and besides priests ride in carriages. He thought I would soon get tired of that; I told him I could out walk the Jews, but he did not understand the joke.

On my way to St. Peters, the first object of importance that attracted my attention was the Fount of Hadrian, now the Castle of St. Angelo. The interior edifice was erected by the Emperor about the year A D 130, since which time it has passed through many changes; at one time answering for the tomb

of the Antony's, at another used for the purpose of a prison. It was here that the famous Benevenuto Cellini was confined by order of one of the Popes, and from which he made his escape, nearly killing himself in the act. It was also used by the Inquisition, whose inhumanities make the blood curdle in one's veins. For ages it has been used as a fortress, and strengthened from time to time. Urban I. stripped a portion of the bronze from the Pantheon which was cast into cannon to fortify it. It is now occupied by the French troops, and the tri-color floats from its ramparts. Soon after passing this St. Peters came full into view, with its majestic front surmounted by its magnificent dome. I stood for a short time at the termination of the collonades to contemplate the scene before me. The beholder at first feels somewhat disappointed; it does not impress you with the idea of its stupendous proportions that you know it to possess. It is not until you have traversed the square in front, aud ascended to its portico, that the reality begins to make itself evident. After ascending the steps you have a beautiful view of the Piazza or square, with its picturesque fountains, casting their sparkling jets high into the heated atmosphere. Midway between them stands the elegant obelisk which once stood in the circus of Nero. It was brought from Heliopolis by Caligula. The beauty of the scene is added to by the crowning glery of Bernini; the circular collonade on each side of the Piazza, on the entablature of which is placed one hundred and ninety-two statues of Saints, each twelve feet high, beyond which may be seen many a picturesque building, a fitting background for such a scene. On entering the church one seems transported to another clime, so cool and refreshing is the atmosphere, which retains the same temperature all the year round. It would be futile for me to attempt to convey an idea of St. Peter's; it is not within the power of language, it must be seen to be understood, and as we gaze up on its vast proportions, we feel the mighty genius of Michael Angelo, while the works of others dwindle into insignificance in comparison. Stand beneath that mighty dome, whose vault is four hundred feet above your head. Look along that vast nave, whose measurement is over six hundred feet. Look upon those superb mosaics—the numberless monuments—the walls covered with rare marbles, and the costly ornaments which adorn the church, the most superb of which is the Baldacchino, or Grand Canopy, covering the high altar. It is of solid bronze, and is over ninety feet in height. It was cast from a design by Bernini from bronze stripped from the roof of the Pantheon. The cost of this precious ornament was over $100,000. It stands over the grave of St. Peter, who is entombed in the crypt below, to which we were shown by a smooth faced attaché of the church, who if I mistake not, dreams of other things than Heaven. In the balconies underneath the dome are said to be placed many sacred relics, portions of the true cross—the sudarium or handkerchief retaining the impression of the Saviours features, and mementos of various kinds which are shown at stated occasions with great pomp and ceremony. The space covered by the building of St. Peters is said to be about six acres, it is estimated to have cost $56,000,000, and now costs annually for repairs and superintendance $40,000. From its first foundation in 1540 to its completion by Pius VI., extended through the reign of forty-three Popes. The visitors, to view this stupendous monument to the greatest advantage, should ascend to the top of the dome and look down upon the strangers below, who look like small moving specks upon the pavement—one can scarcely credit they are beings like ourselves. The view from the outside from beneath the ball, is one of the finest in the world. Beneath you lies Rome, every street and building marked out like a map; while on all sides is spread out the desolate champagna—made picturesque by its long lines of ruined aqueducts—while in one direction far along the horizon, is stretched the Appenines, Albanian and Sabine hills; in the other far in the distance, may be seen the blue Mediterranean. Talk of scenes, the world does not present its equal; although I locked upon the mighty edifice with feelings of awe, yet I could not but feel that with all its greatness it dwindles into insignificance, in comparison with the beauties of that Great Architect, the Builder of the Universe, that living God, to whose service we are told this temple was dedicated. But look around upon those mighty ruins, the pulsation quickens at the thought of what has there taken place. The many acts of cruelty over which Christianity weeps. May not the desolation that reigns around, be but the marks of the Avenger's rod? More anon.

F. D. B. Richards.

From the Journal of the Phot. Soc.

SPOTS ON COLLODION.—OXYMEL PROCESS.

To the Editor of the Photographic Journal:

Sir,—I am surprised that, with so much as has been written in the Journal as to the spots on collodion plates, no allusion has been made to the use of impure pyrogallic acid, since I have reason to believe it is a frequent cause of spots. At any rate I know that the pyrogallic acid sold by many chemists in London contains some impurity which is productive of spots on the plates, and that such impurity, whatever it may be, is soluble in water containing a little acetic acid, since it cannot be seperated from pure acid by filtration through bibulous paper. I believe that the color of pyrogallic acid is a very good test of its purity. When pure it is as white as snow, but is of a greyish color when it contains the impurity to which I have alluded.

I have made several trials of Mr. Llewelyn's Oxymel Process, of which you speak so favorably in the last No. of the Journal, but have not been able by following his directions to get a single negative of the proper degree of intensity—not even by pouring over the plates several successive portions of pyrogallic solution; a circumstance which I attribute to the fact, that, after washing the plates in water as Mr. Llewelyn directs, they contain an insufficiency of nitrate of silver; since by omitting to wash one of my plates I had no difficulty at all in getting the requisite intensity of negative, but in this case the picture developed unevenly. I shall be glad to know whether others who have tried Mr. Llewelyn's plan have met with the same difficulty, and if so, whether by any modification of the process they have been able to overcome it*.

Mr. Llewelyn is mistaken in supposing that by washing the plates in two successive baths of water the *whole* of the nitrate of silver is got rid of. If the plates were freed from the whole of the nitrate by the washing, they would not be at all sensitive to light.

I am, Sir, yours respectfully,

J. Leachman.

METHOD OF EXCITING AND DEVELOPING CALOTYPES.

To the Editor of the Photographic Journal:

Sir,—I have adopted the following plan for some years for applying the exciting and developing solutions to calotype paper, and have found it answer exceedingly well.

The solutions of nitrate of silver and of gallic acid are diluted to the usual extent. Two graduated measures, which should be of different sizes or shapes, are used; one for the nitrate of silver, the other for the gallic acid.

The solutions, say 30 mimims of each, are mixed in a little paper cup, poured on the iodized sheet, and spread with a piece of stiff paper, about 2 inches wide and 4 long, folded in three, and the two corners turned down to hold the loose side. The spreader is about 2 by $1\frac{1}{2}$ inches wide.

A fresh cup and spreader being used for every sheet, both for exciting and developing, their is no danger of the paper turning brown. Which is often the case when the measures, rods, or brushes have been imperfectly washed.

* Mr. Llewelyn's communication in last month's Journal, received since this was in type, seems to remedy this difficulty. Mr. Llewelyn has since informed us that his plates may be kept *a week* after exposure without developing.—Ed. P. J.

An improvement might be made in Mr. Melhuish's slide by substituting a curved glass for the flat one. The pressure-board would not be required to keep the paper against the glass, and the sides of the picture would be in better focus.

If instead of joining the sheets of paper together, the edges were gummed to strips of tracing paper, the focus could be obtained on the tracing paper, and the ground glass might be dispensed with.

I remain, Sir, yours respectfully,

W. F. Thomas.

THE PHOTOGRAPHIC GALLERIES OF CINCINNATI, OHIO.

To the Editor of the Photographic & Fine Art Journal:

Mr. Editor:—After reading your articles about the Daguerrean Galleries in several cities of the United States, I thought of furnishing you one on the galleries of Cincinnati, Ohio.

To go through all the galleries from first to last, and to enumerate their merits or demerits, I consider a rather serious task, and for the general reader as not very interesting. All that should be done is to make notes where it is worth while making them, and to let the rest slide. Examing the Cincinnati galleries from such a point of view, three only would be worth mentioning; they are Faris, Porter and Ball. In every city where there is competition in the daguerrean art, it will be found that one of the operators will have the greatest run of custom in defiance of himself; for, curious as it may seem, this patronage is not always the result of greater excellence; it more generally has its source in some peculiar points of attraction, which helps to make a man or his place popular and without which, he would possibly never have been able, even with the greatest excellence, to become so. And that this really is so, is easily perceived from the instability of this popular favor, for never has the glory of one man or his place been found to be lasting. Their motto should be, to make hay while the sun shines, and never to sacrifice their savings in trying to retain this popularity when they see it fast sliding out of their hands. In illustration of this, let me only mention Hawkins of this city, who had to yield to Ball, and Ball's place itself, which is now struggling in its last agonies,* and is likely to be followed by Porter, whose place already enjoys an enviable reputation.

Faris's Gallery has a fair display of plain and colored photographs of the various sizes, up to the so-called cabinet size pictures—none larger.† He also has the finest display of ambrotypes in the city, but many of them are fast becoming damaged from having been put up by the famous patent style. Lately, Faris has, in conjunction with Hawkins (who has returned from New Orleans), presented the public with a new variety of pictures, which consist of impressions (from negatives) on albumenized glass colored in oil and seen through the glass. These pictures are in some respects rather pleasing and even showy, but their faults and defects do more than counterbalance their good qualities, and are such as will never be overcome. To talk of these pictures superseding all others, is quite ridiculous. It is only a professional painter who is able to produce good results from photographs—and what artist would ever attempt to paint a portrait by beginning with the highest lights and finishing touches, and to end with the regular underpainting? The specimens on exhibition cannot but be pronounced daubs by the connoisseur. Some time ago, Faris opened a second gallery.

Mr. S. Porter, from the firm of Fontayne & Porter, of bygone days, comes next under consideration. This place is now certainly in the ascendant, and his display of pictures of all sizes, is not surpassed in the West. This is the only place in the city where life-size portraits of any dimensions are made, and it may be here remarked, that a larger number of them is yearly turned out, than in any other place East or West, excepting perhaps by Gurney in New York. This will be easily believed, when it is known that his customers are not only from Ohio and the bordering States, but also from the States of New York, Virginia, Arkansas, from the cities of New Orleans and of Boston. At the same time the East cannot boast of better miniature painters than are here devoted to the photographic art, and the same can be said in relation to oil painting. This admits of easy explanation; the prices which would remunerate the good artist for his labors, are considered too high by Western men for their pockets, and many would rather put up with a poor picture at less price. But as in this way, the painter is left without work, he is pleased to develope his talents in the coloring of photographs, and so the public is benefitted as well as the art. Porter has lately opened a second gallery, where daguerreotypes and ambrotypes of a superior quality are produced. His place also boast of a fine life-size portrait of Henry Clay, copied from a daguerreotype likeness not before published.

J. P. Ball's gallery is perhaps the most showy in the city; he has a number of fine daguerreotypes and many good ambrotypes, but his attempts at paper pictures, plain or colored, are rather below par. Photography cannot be forced into a man's place at "short notice;" it requires coaxing rather even when led by experience and study.

Our city boasts of about a dozen more places which do more or less business, some by glass pictures and some with Melainotypes or pictures on laquered iron plates. May they all succeed to their heeart's content. And yet I must not forget to mention landmarks of the wandering Tyler and Co.'s concern, that have been preserved by Woodbridge and his company—may *his* shadow never be less. I only know this much, that those who do not like to pay their "quarter" in advance, think it very convenient to be able to step right across the way where they pay three dollars with the greatest satisfaction for a picture, after they are satisfied with it. Yours truly O. J. W.

* We sincerely trust this is not the case, and that our correspondent is laboring under a delusion. When we visited Cincinnati last summer, Ball's establishment was the most spacious, elegant, and best appointed gallery in the city, while his display of daguerreotypes were of the first order.—Ed.

† It appears to us that this is a mistake, as we remember having seen some very fine life-size heads hanging in his reception rooms.—Ed.

THE RICHMOND GALLERIES.

ANSWER TO "AN AMATUER."

Richmond, Va., July 30th, 1856.

Mr. H. H. Snelling: Dear Sir,—I have this day read an article in your last Journal, giving a sketch of all the different Daguerrean Galleries in this city, and as I think the writer of that article has done some of the operators of Richmond great injustice, I take the liberty of correcting some of the statements there made. Your correspondent sets us all down as an indifferent class of artists; even the wonderful Mr. Moss it appears could not build up a run of business for himself, or for his employer, Mr. Whitehurst. It is very plain to me that envy and self-interest was at the bottom of it all. In speaking of Mr. Gibbs your informant says some of his pictures are very good but lack ease in position. This is not true. Then he says that Powers' and Duke's pictures are mere images; now, I have seen some good pictures made at that gallery,—and then he goes on and gives them all a knock on the head after the same fashion. He is particularly hard on Mr. Osborn, and I think it is but justice to him if I give you a short sketch of his unparralled success in this beautiful art. Mr. Osborne is a native of Springfield, Mass. At an early age he was employed on his father's farm, but not liking that, he went at the fancy goods business, at which he remained several years, but in 1850, becoming displeased with selling lace and ribbons, he gave up trading and learned the picture business. After travelling about the north as well as south, he settled at Richmond, Va., where it is useless to say he will establish a reputation, for he has long since done that. Your correspondent forgot to give the devil his due when he gave you a description of his establishment. But you can imagine yourself at his door, the entrance way wide, fine show cases on each side and on each corner. You then mount one flight of steps to the reception room. This you will

find to be 12 feet high, 60 feet long, and 20 feet wide, completely covered on the four walls with fine pictures. The sky-light is of the largest kind, and is on the same floor. The lady's dressing room is also on the same floor. Two beautiful six light chandeliers ornament the place. The windows, seven in number, are hung with English bunting, red and white, with blue bunting looped up over the top with white stars inserted. The gallery is fitted up in the best manner possible. Mr. Osborne is one of the most liberal men in this part of the country. He came to Richmond poor, but by his own perseverance he has built this beautiful gallery, and what is better, has paid for it, and is now enabled to deal largely in Ambrotype and Daguerreotype stock of every description, being the only artist in Richmoud that is prepared at all times to furnish any order at one hour's notice. Mr. Osborne has speut more money in his business thau any other artist has ever done in Virginia. He has advertised more, aud has to all appearances made more money than auy other artist iu Richmond. Your correspondent speaks very low of his Ambrotypes, but calls him a good daguerreotypist. Now permit me to inform your readers that in this excessive hot weather, when the other galleries are closed or doing nothiug at all, he is kept busy uearly the whole of his time, and gets from $2,50 to $14,00 for his pictures. Now, is it to be supposed that snch a persevering artist is to be outdone by any other artist. We say no. Verily this is an age of humbug, when business men try to build up a reputation by running down their neighbors. With Mr. Osborne there is uo such word as fail. He has only left his business to be gone a day but twice for four years, and one of our oldest artists as well as the public geuerally, say his Ambrotypes are brighter, clearer, and bolder than any others they see. Some of Osborne's Ambrotypes that were carried to Philadelphia were pronounced to be the finest pictures ever seen. Success has followed his every effort, for although the picture business is hard run in Richmond, still Mr. Osborne's business has every year increased. Hoping you will find room in your next Journal for this, I subscribe myself,

Your humble servant,

J. A. Davis.

A PROPOSITION.

Mr. Editor:—Could you not induce some one of the New York Daguerreotype Stock Manufacturing houses, to get up some neat and useful style for puttiug up plain paper photographs. It is curious that so much has been done for the daguerreotype picture and nothing for the others. What we need is some style similar to the one that has been iu use for years in Germany for puttiug up daguerreotypes; so that the picture is always sold under glass and ready for hanging up.

The white borders and white passepartouts used at present are not the right thing. White, uot being a good ground to relieve the photograph, mats of all sizes should be made of thin cardboard of differeut shades of color and tastefully ornamented in gold or colors, (a short time would show the best combiuations). In this way photographs could be afforded aud put up at equal prices with daguerreotypes; the call for duplicates would make it remuueratiug. I have not the least doubt that in this way the demand for photographs would increase rapidly, and the results improve in the same ratio.

Whoever will act upon this, is likely to benefit not only the public and the profession, but also themselves. O. J. W.

Note.—This style of fitting have been imported and sold by Mr. Anthony for the last seven years, of all styles and at all prices. He is now prepared to make them to order.—Ed.

Hydrochloric Ether.—A combination of chloric acid, hydrogen and ether. Used as a solvent of the silver and applied without any saline wash, it has a similar property to nitric ether; but as it is readily acted on by faint light, it is of greater value. Papers prepared with it must be used withiu twenty-four hours, as after that they quickly lose their seusitiveness, and become nearly useless.

From the Journal of the Phot. Soc.

SPOTS ON COLLODION.

To the Editor of the Photographic Journal:

Sir,—In additiou to my letter published in the last Number of the Journal, I would add a few words on auother cause of spots, which I think worthy of observation.

Much has been said and written upon the "impurity of chemcals," and when ether and alcohol are spoken of, most persons imagine that "purity" means "Freedom from water," or chemically speaking, that anhydrous ether (free from alcohol) and absolute alcohol are recommeuded. There canot in my judgment be a greater error thau this. I have washed ether, and after digestion with dried carbonate of potass, have redistilled. In like manner I have digested and distilled alcohol sp. gr. ·827, and with these ingredients prepared collodion, which I sensitized with solutions of iodides aud bromides in the alcohol thus purified. I have thus obtained a collodion very permanent, but never could get a picture that was not covered with innumerable specks. Concluding that this proceeded from imperfect solubility of the iodide and bromides, I cautiously added distilled water and overcame the annoyance, aud the keeping qualities of the collodion did not seem to be impaired.

I cannot prescribe any rule for the addition of water as all depends on the strength of the ether and alcohol, but I am satisfied that anhydrous ether and alcohol will not produce a good photographic collodion.

It is of much importance to obtain unadulterated ether and alcohol, and pure iodides and bromides, and it matters not whether the adulterations and impurities are intentionally added, or are the results of careless preparation: water, however, within certain limits, seems to be indispensable.

Rottenness of film, so often spoken of, I have generally seen associated with *opacity*, and there is great reasou to believe that it results not from water, but the measure of acetic ether originally existing or subsequently generated by some chemical action uot fully understood.

I have observed this rottenness and opacity frequently in old brown collodion after it has been decolorized by zinc or silver foil, though the collodion was originally good.

I am, Sir, your obedient Servant,

W. M. Macartney.

Personal & Art Intelligence.

— The "signs of the time," indicate some remarkable changes iu the Photographic Art, greatly, we trust, to its improvement. We see by the English Journals, that the daguerreotype is commanding more attention from both amateurs and practical photographers, than at any time during the last ten years. Its claims to superiority for portraiture, in many respects, over every other process, and the certainty of their indelible quality, causes the artist in Nature's pencillings to return to it with something of more interest, and with greater desire for its improvement. It seems to be, by general consent conceded, that there are chances for great improvement, and that the only obstacle now apparent to that improvement, may be by diligent research overcome. The extreme delicacy of the daguerreotype, as compared with other photographic pictures; the beautiful gradations of soft and harmonious light and shade, the exquisite degree of tone obtainable by careful manipulation, are dwelt upou by all lovers of the art, with au earnestness of interest we have seldom heard evinced before, and gives us hopes that ere long some modification may be produced in the process that may destroy the unnatural reflection which is really the only drawback to its other admirable qualities. A certainty, however, of permanently fixing the paper photographs, will destroy this prestage of the daguerreotype, simply because we can produce on paper, not only a more artistic, but a more natural picture. By using this expression, we do not consider we

are committing an incongruity, for art to be pleasing must reflect nature in all its truthfulness. We must not only have all the beautiful and harmonious gradations of light and shade, all the poetry of effect, but we must also have the facts and details in nature, all the causes of effects that bring to the mind every pleasing association produced by the remembrance of the object depicted. In many phases of society "*art*" has a very different signification, inasmuch as it is applied to various operations which go to increase attraction, and give pleasure to the eye. "*Art*" is one of those English words which have too broad a meaning, for it conveys to the mind diametrically opposite ideas. We speak of *nature* and *art* as distinct subjects, and yet they are so intimately allied that one cannot be separated from the other, in forming those structures, or producing those paintings which instruct and please the mind in the contemplation of the sublime and beautiful. Hence it is that paper photographs may be said to be more artistic as well as natural. They bring to the eye the object depicted in greater detail, the texture, as it were, is better preserved; they are capable of more varied color and tone, more warmth, and produce a more natural effect in light and shade. Where we have a brilliant or subdued *light*, according with the nature of the object or view in the photograph, we have a disagreeable *metallic lustre* in the daguerreotype that disturbs the eye, and consequently creates dissatisfaction in the mind. Every one who has looked upon a daguerreotype landscape, must have experienced this sensation, although possibly, unable to account for the cause. While admiring the beauties of a fine daguerreotype, we feel there is yet something wanting to produce that pleasure of the mind, which we are led to expect from works of art. Again, we can produce by photographic printing, a much greater variety of styles—we can introduce accessories that give fine relief to the picture, and we can make many other modifications such as we cannot in the daguerreotype, and all these points commend the photograph over the daguerreotype. Therefore the only requisite to the popular adoption of the photograph—we must be understood as speaking of the plain unretouched pictures—in preference to all others, is the certainty of their permanence. Until that certainty can be attained, the daguerreotype must continue in the ascendant.

— This brings us to speak of another recent and valuable improvement in the art—we may well say three improvements. The first on the list, because the earliest produced, is the *Melainotype* of the Messrs. Neff, of Cincinnati, Ohio. These pictures, a few of which we have but recently seen, are truly very fine, and susceptible of a high degree of finish. They possess many of the qualities of the daguerreotype and photograph combined, and are certainly deserving of greater consideration from our photographic artists, than they have yet received. They can be produced at a cheap rate and easily brought to perfection by a skilful artist. The next is the *Hallotype*. Of this, we have given our opinion fully in a former number, and can only reiterate what we then said. The third and last, is a new style, first shown us by Mr. Rider, of Cleveland. They have been named the "*Atrograph*." Since then, we have seen some taken by Mr. Brady. For *plain* portraits, they are destined to take precedence of the *Ambrotype* pictures. Those who have seen the portrait of Mademoiselle Rachel, by M. Niepce de St. Victor's photographic engraving process, and can imagine a picture with all the strength, soundness and sharpness of outline possessed by that engraving, subdued by a softness of tone, and a delicacy of color to the most exquisite degree, may form some idea of the beauty of this picture. In the manipulation a most remarkable effect is produced, giving the picture the appearance of a stipple engraving, far more delicate and perfect than it is possible for the hand of man to produce. Every line and lineament of the figure is strongly brought out in the minutest detail. Every hair on the head is visible and resembles the natural object so closely, that it requires some force of the will to dispel the delusion created. The eye is reproduced in all its perfection of expression and vivacity, to a degree we have never before seen in any work of art, and every part of the picture is correspondingly perfect. These pictures alone can take precedence of the daguerreotype in portraiture. They have all the softness of the latter, with all the qualities we have enumerated. Being taken on enamelled black paper, they require much less work in the production, and we believe they are susceptible of a greater degree of perfection. It has been suggested that they are similar to those produced in Europe some years since, on black leather and paper; but they are much superior, and the only analogy between them is the black paper. Those executed in Europe were collodion transfers, while these are taken direct from the natural object in the camera, by the collodion or albumen processes. With these three processes in the field, six months will witness the total eclipse of the *Ambrotype*.

— The introduction of these improvements, and the many phases and changes photography is rapidly undergoing, induces us to call attention to Mr. Davie's "*Appeal to Photographers*," which will be found in another column, and we hope that that appeal will not be disregarded. Never was there a time when it was more incumbent upon members of the art of photography to unite in a body for self-preservation and the improvement of the art. Tramelled by the false secrets of individuals, the art is constantly kept at an inferior grade in position as to art in general, and it requires more than individual interest and exertion, and the influence of the publications devoted to it, to elevate it to a high standard. An association might be formed useful to the art and to each member. The Photographic Art has now been practiced in this country over sixteen years: the majority of those now engaged in the business, have been so at least ten years; and is there one among them all who can truthfully say that he ever made a discovery in the art of practical utility from which he ever derived the least permanent value to himself? Did we not know to the contrary, we should entertain the same opinion that we have heard frequently expressed by gentlemen out of the profession, namely, that conscious ignorance on the part of our photographers is the great stumbling block in the way of the organization of a permanent Photographic Society. The real causes, and most foolish ones too they are, are envy, hatred and malice. Among all the class of men among whom we have been thrown during life, we know of none where these vices so predominate. They are mistaken for superiority, a laudable desire to excel, and ambition, and these overruling all other actions and feelings of the practical photographer, close his eyes and heart against all the more manly attributes of his nature, and severs those who should be closer knit in the bonds of interest and friendship. Had the American Daguerrean Institute, or the N. Y. S. D. Association been in active operation ever since their first formation, hundreds of dollars would have been saved to nine-tenths of our photographers, and the hosts of nondescripts in the art, who have fattened upon the ignorance of the majority, could not have practised their speculative schemes. Every valuable and reliable improvement would have been brought before our artists in a legitimate manner—the gold would have been separated from the dross, and the present state of the art would have been advanced far beyond its present position. What is more strange than all, experience does not seem to be a teacher among photographers. The ideas of utility, progress and availability, make no progress. They are, with the majority, just where they were seven years ago. Painters begin to see and acknowledge the unlimited availability of the photographic art; to acknowledge the assistance—which we predicted in almost the first number of this Journal that we issued—that photographs gives them, not only in painting, the "human form divine," but in landscape drawing, and even in composition. As an instance of the latter we would refer to the pictures in our seventh volume, of the "Woodsawyer's Nooning," and the "Three Pets;" and also to several other compositions by Hesler of Chicago and Barnard of Syracuse. Here we have the original natural objects grouped together, as we desire them, with the true natural expressions given to each. For the painter to produce these effects he must either draw upon his imagination—too often a very bad and incorrect source to depend upon—or else he has—at great cost—to ob-

tain a series of sittings from living models, frequently having to change the model in depicting one character of a group, and consequently obtaining expressions of countenance and general contour at variance with the subject under consideration; or at least giving to the subject a very feeble representation of his design. By employing the photographic art, an entire composition can be conceived and executed in a few minutes, requiring very little labor in securing appropriate models, and very little expense in its execution. This result he can place before him at any time of day as best suits his convenience, without being obliged to depend upon the vagaries of several living models, and having his patience tried by repeated disappointments, and paint at his leisure, his own genius and skill being alone requisite to supply the colors with the best effect. He even need not spend his time in sketching an enlarged copy of his photograph upon his canvas. Photography will do this for him also to any size, and he can, with one-twentieth part of the labor formerly bestowed, ensure an outline drawing in which every line and feature, is truer to nature, than could possibly be executed by his pencil. Six years ago we said all these things would come to pass. Artists, who then denied and scooted our assertions at that time, are now painting in this way, and we have repeatedly heard from the lips of some an unreserved acknowledgment, of the essential aid they daily received from photography.

Where the usefulness of the art will end, it is impossible to say. What new phases it will exhibit a year hence none can tell; it is therefore a matter of self interest for every photographer to place it in that position which shall command the highest respect. Individual effort can accomplish much, but united effort a vast deal more. We really think that our most prominent photographers are very culpable in this matter, and sincerely hope a better state of feeling in regard to it may be obtained, and we earnestly urge communications on the subject from all. Let one more trial at least be given; endeavor to throw aside all personal feeling, and let the only consideration which actuates you, be the welfare of the art.

— Isaac Tucker.—We cannot send a specimen of the *Hallotype*, for the very good reason that we have none to send, Mr. Hall, or Mr. Gurney not yet being prepared to communicate with photographers in regard to them. Very few have yet been taken, and only one or two exhibited at Mr. Gurney's gallery. The reason assigned for this is, the desire to secure the patent before proceeding further in the matter. Although a patent is to be obtained, we are informed by Mr. Gurney that it is in contemplation, to place the process before the photographic community, on the terms proposed by us to Mr. Hill on the first announcement of his "natural" discovery. That we are not singular in our opinion of these pictures, we would state that a number of our first artists have seen them and pronounced our judgment of them correct. These same gentlemen have also seen the *Hillotype* pictures, now on exhibition at 57 Chamber street, New York, and give decided preference to the *Hallotype*. Mr. Finley of Canandaigua, says, there is no comparison between them; the Hallotype is far the most beautiful style of colored photographs he has seen. All others have expressed themselves in equally warm terms respecting them. We say colored photographs; but there is very little coloring done with the brush, both Mr. Gurney and Mr. Hall assuring us in the most positive terms, that the most important portions are colored during the chemical process. We have, also, the word of the gentleman who drew up the patent specifications that such is the case, and that the process is entirely and essentially different from any he has seen published. Our friend Seely claims that this process is the same as his *Chemitype*, but this claim is as positively denied by both Mr. Gurney and Mr. Hall. We do not consider that we are called upon to decide between them, and shall suffer them to settle the controversy as may be most agreeable to themselves, being willing that all who may see the two styles, shall form their own opinions in the premises.

— C. D. Fredericks, has opened a new palace of Photographic Art at No. 585 Broadway, New York. His reception room is the largest in the city, and is furnished with elegant and refined taste. Elegant mirrors, and colored and plain photographs finished in the highest state of the art ornament the walls, while the centre of the rooms is occupied by sumptuous circular and oval sofas surmounted by statuettes. The artist's studios and the operating rooms are spacious and replete with every convenience. His artists are of the highest ability in every department, and no effort has been spared to enable him to execute portraits in every style to the utmost perfection. Years of experience, an indomitable will, and industrious perseverance, are desideratums for the successful prosecution of the photographic art possessed in a high degree by Mr. Fredericks, and we have no doubt that his energies will, in this instance, reap the reward he so justly deserves. On Monday evening, August 20, Mr. Fredericks opened his rooms by a grand entertainment of music and a cold collation. As may be expected, joy and gladness abounded. Mr. Fredericks, after repeated calls, in a brief speech introduced himself to the large assemblage, and was greeted with unbounded applause; and so well pleased were the guests with his words and acts, that none others could command attention. Several gentlemen were called upon for remarks, but the hilarity was so great, that little more than their toasts could be heard. The music, which was furnished by five young musicians recently arrived in this country, and abandoned by their protector, was exceedingly fine. The evening passed off very pleasantly indeed, and the assembly did not break up till a late hour. We almost forgot to notice the fact, that Professor Hall has secured rooms with Mr. Fredericks, and will execute his admirable Hallotypes for the establishment. This will not interfere with

— Mr. Gurney, who will, in conjunction with Mr. Hall, produce them at his old and elegantly appointed gallery. Mr. Gurney has also secured the services of that prince of photography—

— Mr. Moulton, whose claims as an artist of marked ability, are inferior to none in the world. In all other branches of the art, Mr. Gurney is equally well prepared.

— Mr. Brady is again rusticating in the country, while at his gallery, the Ambrotype continues to be the attraction, and here they are made as perfect as they can be.

— Mr. Glosser is daily winning fresh laurels at Mr. S. Roots with his plain photographs, and well he may, for he produces many gems that defy competition.

— Mr. Webster, of Louisville, has spent several days in our city, devoting himself to the study of his art, and we doubt not has returned home well prepared to instruct his fellow townsmen in the more recent improvements. Mr. Webster exhibited some exquisite specimens of the *Sphereotype* which do him great credit, and mark him as a true artist.

— Mr. Fitzgibbon has also been among us, laying in a store of useful information for future use. His energy and perseverance in the improvement of the art, must command that success he so richly deserves, and which we wish him with all our heart.

— Mr. C. Barns, of Mobile, has also visited us, but he brought no specimens of his works. The estimation in which he is held at home, is worthily set forth in an article we recently published from a Mobile paper.

— Mr. Geo. S. Cook has purchased the establishment of Mr. M. A. Root, of Philadelphia, to which he will devote the most of his time during the summer months.

— Mr. Simmons has also removed to Philadelphia to be among his old friends, and being thus brought nearer to us, we shall expect to hear often from him.

— As we stated in our last number that we should insert no more photographs in our Journal, until we could obtain some reliable person to print them, our present number is minus in this respect. We are in treaty for a printer who, we think, will meet all our requirements; at all events, we shall procure one so as to enable us to give our subscribers their full complement before the close of the year, and of a much better quality than herefore.

"OLD MAN OF THE MOUNTAIN."

White Mountains, N. H.

Negative from nature, by F. White, Lancaster, N. H.

From the Jour. of the Phot. Soc.

TAUPENOT'S PROCESS.

To the Editor of the Photographic Journal:

SIR,—You have been pleased to ask me for some notes on M. Taupenot's process. I hasten to communicate them to you, as much for the purpose of thanking the London Photographic Society for the kind reception which they gave me, as to contribute, as far as I can, to extend a process which ought to be placed in the first rank. Albuminized collodion is the quickest of the dry processes, and if it is not so simple as the keeping processes of Mr. Maxwell Lyte and of Mr. Pollock, it has undoubtedly the immense advantage of giving to plates an unlimited sensibility; and I think that I may use this expression, since I have presented the French Photographic Society a negative obtained after an exposure comparatively short (twice that of ordinary wet collodion) on a plate which had been prepared for *seven months and ten days*. M. Taupenot's process does not at all lessen the importance of Mr. Pollock's, and cannot displace it. They have each their usefulness, most indisputable and different. The collodion preserved by glycerine seems to keep all its sensibility, and to allow pictures to be taken in some seconds, eight hours after the glass has been collodionized.

M. Taupenot has given his process without reserve to the Institute, and to the French Photographic Society. The clear and judicious article in the Bulletin of the French Photographic Society, Sept. 1855, has explained in detail all the process. M. Fortin, and, above all, M. Bayard, whose names are well known among photographers, have modified the manipulations in such a manner as to render them simple and enable them to be practised with certain success. These are my authorities, to whom you are indebted for nearly the whole of my communication. The article reprinted in your Journal, No. 35, Oct. 1855, should be read again, as this paper is only its corollary.*

I am, &c. &c.,

E. F.,

Membre de la Soc. Franc. de Photogr.

I will begin by giving all the formulæ generally used for the albuminized collodion process. The proportions here set down are those which are most successful both for the reproduction of oil paintings and statues, and for subjects taken from architecture and landscapes.

§ I. A.	Common potash	1 ounce.
	Water	1 pint.
B.	Tripoli	1 drachm.
	Nitric acid	15 minims.
	Water	1 ounce,
§ II. C.	Ether, sp. gr. ·759	6 drachms.
	Alcohol " ·848	2 drachms.
	Gun cotton	4 grains.
	Iodide of Cadmium	4 grains.
	Bromide of Cadmium	½ grain.
D.	Crystallized nitrate of silver	35 grains.
	Distilled water	1 ounce.
§ III. E.	Albumen	2¼ ounces.
	Distilled water	¾ ounce.
	Liquor ammoniæ	30 minims.
	Iodide of potassium or ammonium	10 grains.
	Bromide do. do.	3 grains.
F.	Crystallized nitrate of silver	40 grains.
	Crystallized acetic acid	40 minims.
	Distilled water	1 ounce.
§ IV. G.	Saturated solution of gallic acid	2½ ounces.
	Pyrogallic acid	1 grain.
	Alcohol	25 minims.
	Common acetic acid	20 minims.
	At the moment of using it add—	
	Crystallized nitrate of silver	1 grain.
H.	Hyposulphite of soda	1 ounce.
	Water	10 ounces.

* See page 321, vol. viii., Photographic and Fine Art Journal.

§ I. The cleaning of the glass for the albuminized collodion process, as for that of the albumen, is a most important point, and one on which often depends success or failure. All those who have tried this last process know how many failures they have met with, how often those unlucky blisters, which always increase in proportion as the image is developed, spoil pictures which promised to be so beautiful. For my own part I have changed my baths twenty times, thrown away my albumen and gallic acid solutions a hundred times, changed my glasses and dishes,—in short, I tried every means except the most simple; namely, that of changing my method of cleaning my plates. It is almost always too much or too little cleaning which causes this inconvenience. I did not suspect it, and was just about to give up photography when M. Bayard came to my help. He had never had a blister on his negatives; he was perhaps the only man sufficiently lucky for that; he taught me to clean my glasses, and since that day I have never had a single blister. The following is his method, as simple as easy to practice; by it a glass of 12×15 inches may be cleaned in two or three minutes.

When the glasses have been used they should be allowed to remain for some hours in the solution of potash (formula A); then with a strong horn pallet-knife the film is removed; after having wiped the glass it is put away to be used when wanted. This solution of potash will serve for a long time. Scrape the glasses immediately before collodionizing them,—a dozen, no more. If you intend to prepare more, perform this operation half at a time, so as not to allow too long an interval between the two operations.

Put the glass on a quire of white paper, the side which you do not prepare upwards; take three *pads* as thick as the first, made of fine polishing cotton; with the first re-cover the glass with tripoli (formula B); with the second, remove carefully the layer of tripoli, which you have just applied; with the third you rub the glass afresh to satisfy yourself that the glass is quite clean. It is necessary that the two last operations should be quickly performed without giving the tripoli time to dry; you must also begin at the left corner at the bottom, work towards the right corner, and so go up the glass horizontally without passing over that which has been done. With a little skill you can succeed perfectly, and the glass is better cleaned than by any other means.

The first surface being polished, the same operation is performed to that which it is intended to sensitize. The palm of the hand is passed over the four edges of the plate, to make sure that no dust remains attached to them; lastly, a silk handkerchief is passed lightly over the two surfaces, and the glass is put into a grooved box, or better upright against the wall.

At the moment of applying the collodion, it is only necessary to pass over the glass a gilder's brush, which will remove the dust that may have fallen on it. This small instrument is very useful; it makes the glass very polished, and does not elicit electricity.

Since I have used this method, I have never had to regret the loss of a single plate through blisters. I advise those who have experienced this inconvenience to try this very simple means, and I promise them that they will protect themselves from this enemy.

§. II. *Collodion.*—It is very essential that the collodion film should be very adherent to the glass, and that it should be in a state entirely opposite to collodion which we wish to transfer on paper or on gutta-percha. If, then, in the one case, the collodion ought to be very thick, as much as possible anhydrous, and containing plenty of alcohol (and these three qualities are necessary to detach the coat), our collodion ought to be clear, may contain a little water, and ought to include the least possible amount of alcohol.

I only put 8 parts of alcohol for 1000 of cotton. I use ether of ·759, and alcohol of ·848, and I only put 20 or 25 parts of alcohol for 100 of ether, sometimes less (formula C).

I use iodide of cadmium because I can dissolve it more easily, and it remains a very long time in good condition; otherwise

any other iodide would answer the same purpose. I add a little bromide, because it seems to give more rapidity, and to make the color come out better. If the collodion is thick, it will not only be difficult to bring ont the picture well, but also to preserve the collodion film. It will perhaps detach itself entirely in drying after the secoud silver bath, this is because the collodion will then have had too much contraction and will have lifted the film of albumen.

The collodion being slightly thick, and containiug much ether, it will quickly evaporate; it will then be necessary to make haste to spread it over the glass in order to have a well-united film. I have succeeded very well by pouring it plentifully on the middle; I make it run very quickly to the corners, and pour off the surplus by the bottom right-hand corner into a funnel furnished with a plug of cotton, through which it filters and drops into a bottle. I have only to add a little ether to it to give it the requisite fluidity; and I do not care if the moisture of the air add to it a little water or render it slightly acid. I confess that I should not venture to decide if the greater or less sensitiveness of the collodion would contribute to render the plate more or less sensitive. At first, every one thought that only the first coating of iodide of silver was necessary under the film of albnmen; uow, opinions are divided; some think that the greater the sensitiveness of the collodion film the more it is influenced by the length of time of exposure. I had prepared a long series of glasses sensitized to make comparative experiments; but I have been unable to find the note-book in which I had put down the preparations which corresponded to the nnmbers of the glasses.

I thonght for a long time that the sensitiveness was always the same, but now I will not give an opinion until I have renewed my experiments. I will theu hasten to acquaint you with the results, thongh probably you will have decided the questiou before I can. It is besides of the highest importance, since it encourages the hope of obtaining a rapidity equal to that of wet collodion, by modifying the first and probably the second sensitized film.

At present I have obtained a sensitiveness ten times as great as with albnmen alone, and but twice, or at most three times less than with ordinary wet collodion.

Another questiou here presents itself which is connected with the last. Does the image come on the collodion or on the albumen? Sometimes it has the appearance of being on the one, sometimes on the other; but I think that this only depends on the manner in which the negative has been developed; and that the image is produced on the albuminized film to which the first coating of iodide of silver has given great sensitiveness; unless, as is the opinion of M. Humbert de Molard, whom all consider an anthority, there is formed between the iodides of the two coatings, a combination which makes of it a coating of a new kiud.

I put my glass for five minutes in the silver bath; I often make use of the same bath of aceto-nitrate to sensitise the collodion film, and also for the albumen film, withont troubling myself about its being often as black as ink. If it were proved that the collodion ought to be very sensitive, it would be necessary to guard against this, and the acetic acid should be dispensed with even in the second silver bath, the nitrate of silver alone coagulating the albumen sufficieutly.

After the silver bath, I put my glass into a dish containing plain water. I pass and repass the water over it; I put it in a second dish, and repeat the operatiou. Lastly, I pour a great quantity of water over the glass, and I finish by washing it twice with distilled water, so that no extraneous substance shonld remain on it. I let it drain for a minute or more on oue corner; lastly, I take it up on my five fingers and pour on it the albumen.

§ III. *Albumen.*—You will find, in the article of October 1855, already mentioned, very lengthy aud particular explanations how to ferment the albumen; I can only refer you to it, having nothing to add on the subject.

I have not been in the habit of nsing fermented albnmen, finding it easier to preserve it by introdncing into it ammonia (Formnla E) though that does not render it more sensitive. But as whites of eggs may be met with anywhere, I do not like to carry them about with me; besides it seems to me less tronblesome and sooner made if it is not allowed to ferment.

M. Humbert de Molard and M. Fortier have successfully tried albnmen dried and dissolved; they have obtained the same results as with fresh albumen. This way is certainly the easiest, since dry albumen can be bought very pure.

I will describe the method I generally pnrsne. I pnt into a dish the iodide, the bromide, and sugarcandy, when used, which is not always. I melt them in water, and add whites of eggs and ammonia; I beat them all up together as long as possible. The next day I strain the whole through a fnnnel fitted with a cotton plug or filtering-paper. I then ponr off the albnmen into bottles of 4 or 8 ounces. I fill them full, and cork them tight. I keep it thns as long as I waut. If it gets thick or forms threads, as is also the case with fermented albumen, I have only to filter before using it.

I pour the albumen plentifully on one of the sides of the glass, and I take care that it spreads in a well-nnited sheet, and that it reaches as quickly as possible the corner at which I drain it off. If the plate has been well washed, and if the albumen coating has been spread without stopping, there is every chance of getting a good picture; but if either of these points is wanting, veins will perhaps be caused which will traverse the whole of the negative, and which cannot be seen before development. The albumen, which is poured off from the glass, will do again if filtered. The glass should be left to dry on one corner; this will take five or six honrs.

All these operations can be performed in daylight; bnt it is generally admitted that in this case the plate loses some of its sensitiveness, and that the negatives are less clear, and so I find it more prudent to conduct them in a dark room.

All that remaius is to put the glass, well dried, in a bath of aceto-nitrate (formula F), and wash it as carefully as after the bath of collodion. It is needless to say that the second sensitizing bath can be used a very long time after having spread the coat of albumen. It is probable even that the glasses can be kept for more than a year, and put into the bath of aceto-nitrate after that time. This point, however, I have not considered it necessary to investigate, because there is no real use in having the power of preserving the glasses, except they reqnire no other preparation. The glasses prepared for some time lose a little of their sensitiveness, but not mnch.

The albumen must not be iodized with the iodides commonly called metallic. They have the well-knowu property of coagnlating the albumen. There is no iuconvenience in adding to it iodide of potassium; there is only one little precantion to observe,—this last iodide almost always contains a little carbonate of potash, which is liable to cause an infinity of small holes on the plate: it is therefore important to put an excess of iodiue. For this purpose introduce into the bottle which contains the iodide of potassium, a particle of crystallized iodine, which will color the iodide somewhat yellow; the inconveuience need no longer to be feared, but an infinite small quantity of iodine will be reqnired, or it will coagulate the albumen.

The same precaution might be taken with the iodide of ammonium, but it is less necessary, since this salt being very volatile nearly always leaves the iodine in excess. Neither kaolin nor charcoal, nor anything else must be added to the bath of silver; it is quite needless that the bath should be decolorized. I have obtained my best pictures with dark brown baths; and I have ofteu found it inconvenient to have fresh baths. It is necessary when the flat dish is nsed to filter the bath each time; but I use the vertical glass-bath, and I often go on with the same bath for months together without filtering; I content myself with passing over the surface beforehaud a strip of thick paper to remove the settlement of silver which may have formed there. I add from time to time to my bath a solution of silver of 50 grains to the ounce to keep it at a proper strength.

§ IV. *Development of the image.*—It is necessary to dissolve gallic acid iu cold water (formula G), decant it, and add alcohol, which will dissolve those parts not before dissolved, if any; then pyrogallic; lastly acetic acid; then filter. At the time of

using add the quantity of nitrate of silver required, after having dissolved it in a few drops of distilled water. There are serions inconveniences in adding to it any of the bath of silver prepared for another purpose.

It should be understood that the formula which I have given must be modified according to the images that are to be developed. If the exposure is insufficient, a little more nitrate mnst be added; if to get more equality and less contrast between the lights aud shadows the exposure has been *very* long, it is necessary to diminish greatly the proportion of gallic acid, to increase that of acetic acid three or four times, and begin the development without silver; the same must be done if the picture seems to have been exposed too long. When I develope the negative of a landscape which comes out very quickly, I use a screw-foot stand; but ordinarily I develope in a horizontal glass dish. I put it on a table nearly level, and place under it a sheet of white paper; I incline it towards me by means of a small wedge, but slightly. I pour in the liquid; then placing the edge of the glass on the lower side of the dish, I support the plate by a little whalebone hook, and let it slowly descend upon the liquid, the prepared side downward, of course. I take care that it is placed quite equally in the bath without stopping, and without any air-bubbles; I let it remain on the hook, and lift it from time to time so that the air may come in contact with the sensitized side, as this seems to hasten the development. If the proper quantity be put in the dish all the sensitized part will be wetted, and the liquid will not touch the back. This manuer of proceeding has great advantages; the development of the image can be seen without taking it out of the solution. If a precipitate is formed it does not touch the sensitized coat, and the method is easy, and allows the development of several pictures at the same time. If, however, the bath becomes black, the solution must be thrown away and renewed; the plate must be well washed, and the dish well cleaned, and above all well dried with "papier Joseph," or white blotting-paper.

If any sediment of silver be formed on the picture, it can in this process, as in that of albumen, be removed by brushing it with a light brush of cotton-wool; when the sediment is fresh, it can be easily removed with a little practice.

The time of the development of the image depends on the time of exposnre, on the subject, and on the strength of the developing agent. If it is a landscape which has been exposed the ordinary time, aud developed with the given solution, it will often come out in ten minutes; but under different conditions, and with a different subject, it will sometimes take several hours. As the pictnre loses much in the hyposulphite, it should be developed a little too strong.

It is not indispensable to wash the plate when it is placed in the flat dish to develope. We need not be discouraged if the image is long in appearing; one of the great advantages of this process is that it enables us to obtain almost always *a* picture, and even a strong one, after any kind of exposure. All depends on the development; the plate will often be *two* hours in the bath without showing any trace of an image; aud yet at last we succeed in getting an excellent negative, after several hours of patience. The less nitrate of silver is used in the bath, the more clear and in keeping will be the plate; as little as possible therefore should be added.

If the development is necessarily interrupted, the plate must be carefully washed in distilled water, and placed on one corner near the wall, in perfect darkness; and the development may be finished even two days afterwards, having previously wetted the plate with the distilled water.

§ V. *Fixing.*—After having developed the image, it should be carefully washed, and placed in a solution of hyposulphite of soda (formula H); the cyanide will remove the coat of albumen. If the negative is feeble, it may be put into a solution of 3 per cent. of hyposulphite, and left there only until the edges begin to lose the iodide a little, and then washed. This plate will give a very soft and agreeable positive.

§ VI.—*Varnish.*—It seems to me quite useless to varnish the plate even with albnmen; it is very firm, and allows an infinite nnmber of proofs to be printed from it without this precaution.

A collodion picture can be varnished with albumen; it will lose little strength; but if we wish to keep the plate, care ought to be taken not to pnt it back into the bath of silver or of hyposulphite; this would be to run the risk of two operations which might destroy the negative without any compensation, because it is useless to coagulate the albumen when it has no end to serve but for varnish.

If a picture on albumiuized collodion be too strong, in such case only should we venture to varnish it, in order to give it transparency, and there is no doubt that the preference should be given to a varnish of Mr. Maxwell Lyte's, the formula for which he has given us, viz. amber dissolved in chloroform with the addition of 50 per cent. of either.

It only remains to give the method of keeping the sensitized plates; it is easy and economical. Take some silk ribbon of an inch wide, and abont as long as the glasses; stick along each side of its whole length a small band of thick paper, somewhat wider than a third of the ribbon; the middle of the ribbon is thus left uncovered. Put this so that it doubles over the two edges of the longest sides of the glass; put the glasses one on the other, the sensitized sides facing each other. Make them up into packets of six glasses, and on each side of the packets lay a sheet of black paper the size of the glass. Fasten them all together by means of two india-rubber bands; again cover the packet with white paper, then with black cambric; put the whole in a dry cupboard, and they will be ready when wanted.

For the greater part of the above formulæ we are indebted to M. Bayard; I have veutured to communicate them without his authority, becauseI know that he will be happy to contribute to photography still more than he has already done. I am but his unworthy interpreter. E. F.

From the N. Y. Daily Times.

POWERS' STATUE OF AMERICA.

I have a correction and a criticism to make to-day in regard to this statue. On seeing recently that a call had been made in Congress for information on this subject, I took occasion to make some comments thereon. These comments were immediately responded to in your columns by two writers, both of whom very properly corrected an error into which I had fallen, while one of them commeuded the criticisms I there made. I find by further inquiry that it is true that Mr. POWERS did at last decide into what shape he should work out the block of marble that lay long in penitence under the foot of the statue, and that this decision was a broken chain. But it is none the less true that a crown and sceptre, a rope and a broken chain were severally under consideration during the period of five years that the block of marble remained in incubation, and that it is only within a year that the chaiu could have been fixed upon.

This point settled, I should like to ask the sculptor, or the friends who were instrumeutal in obtaiuing this order, what is meaut by the broken chain? Chains are never used by artists but as the symbol of slavery, and there are, therefore, but two senses to which we look to fiud the artist idea in the present couception. The one is the negro slavery of the Sonth, the other the condition of the colonists before the revolution. It cannot apply to the slavery of our Slave States, for the simple reasou that this slavery has never been abolished. It must, therefore, refer to the conditions of the colonists antecedent to the revolution: and in this sense the symbol of a broken chain is a slander upon history and upon the American nation. The colonists were never slaves to anybody; their separation from the mother country was not the separation of slave and master. And if they never were in chains, they had none to break. Jamaica and St. Domingo were iu a state of bondage, and to put broken fetters beneath the feet of WILBERFORCE would be in accordance with history and with the true meaning of the symbol. But America never librated, never broke the chains of any people

in bondage. Mr. Everett himself, who is the protector of the eminent artist, in every page of his published "Speeches and Orations," now before me, lays down and reiterates the proposition that America never was in a state of slavery. Freedom, according to Mr. Everett, and indeed every American historian, was a birthright brought over and planted by the Puritan Fathers on Plymouth Rock, and it was an attempt of King George to take away that freedom which brought about a revolt and the war of Independence. It was precisely because they would not be slaves that they revolted. A slave according to all lexicographers, is a person who is wholly subject to the will of another. So according to all the lexicographers and to all good artists, chains alone represent this condition. Mr. Powers himself has concentrated this definition by placing chains on his Greek Slave, in orders that the public might not mistake her for a Venus. The great cause of Revolution was the attempt to levy oppressive taxes on free men, coupled with a denial of the right of representations. England sought to impose upon the Colonies a species of political slavery, but she did not succeed, for her subjects revolted. When the revolt commenced, it was not with the intention of seeking a separation from the mother country, but to obtain a redress of grievances. It was only when their revolts were unheard and their petitions repulsed that the Colonists determined to go further and declare complete independence. The broken chain therefore not only does not typify the character of our institutions, but it falsifies history and bears a slander on the noble-hearted men who founded our great Republic; and I now say that not only is twenty-five thousand dollars an absurdly exaggerated price to pay for such a statue, but that the statue ought never to be allowed to cross the Atlantic. Its presence at Washington could give pleasure to no one capable of comprehending the grandeur of the statuary art, or of understanding the true meaning of artistic symbols.

But there are other details and other objections to this statue —"celebrated" as the Venus of Milo, but not "celebrated" as America, as one of your correspondents says. To represent America, to say nothing about the price, we should have a grand, and especially an orignal conception, and not of a cold ideal figure, to show off anatomical proportions. It should be original in design as is our Constitution, vigorous in action as is our nature, and instructive in effect as is our success. The statue in question is intended to offer three symbols: the female figure which represents the condition of slavery from which she imerged through the war of the Revolution, and the upraised arm, which is a mystery. The gesture represented by this arm (the arm of Venus that was supposed to rest on Mars in the original) is positively beyond comprehension. It has a "come-on-boys" sort of air about it, which is totally imcompatible with the exquisite proportions of the figure, and the elaborate finish which has been put upon it.

Does the half-naked female figure however beautiful in its anatomical proportions, with one hand pointing upwards, and one foot trampling on the symbol of emancipated Slavery truthfully, historically, typify America, in all the greatness and originality of its birth and growth? Does such a conception, if it may be dignifyed with the title, either respond to Mr. Powers' reputation as an artist, or to the design of Congress who authorized its execution?

Mr. Powers commenced his statue without knowing how he was to get out of the dilemma into which his companions would inevitable lead him. Sculptors, in all the times past, have had a difficulty in symbolizing tyrany and oppression. Mr. Powers had before his eyes, in the public places of Florence, the great works executed during the Republic, to illustrate the state of tyrany and oppression from which the country had escaped, and which was variously typified by the triumph of justice over tyrany, of right over might, or of good over evil. Thus we have the various combats and victories of Hercules, such as killing the Nemean Lion, or the monster Gorgon; Perseus decapitating Medusa; Theseus destroying the Minotaur; Judith and Holofernes; David and Goliath; the figure of Virtue triumphing over Vice, where a young and slender female is trampling under foot a large and athletic man, whose face betrays every bad passion, &c. But nowhere can Mr. Powers find such a perversion of the symbol of Slavery as that which he has placed on his statue of America. And this is the only *original* point of his statue?

Since my first mention of this subject I have made inquiries in regard to the price of statues in Paris and elsewhere. I find that the best sculptors of Paris, and I am permitted in this connection to use the name of Baron Frigetty, receive on an average four thousand dollars for statues ten feet high. But the ablest sculptors of Italy receive much less than this sum. The statues recently erected in Florence to the memory of the illustrious men of Tuscany, sixteen or eighteen in number, cost something over one thousand dollars each, most of them executed by men who rank higher in this department of art than Mr. Powers. It is not pretended that this sum adequately rewards their talents, but they accept such commissions to further the patriotic objects of their Government. Mr. Powers himself has given us a guide by which to estimate the price of a single statue, in his several copies of the Greek Slave, which he has sold at three thousand dollars each. Give his workmen an additional, thousand dollars and they will execute the Slave ten feet high, the sculptor having no extra labor to perform.

From the Journal of the Phot. Soc.

CHEAP PRINTING FRAME.

To the Editor of the Photographic Journal:

Sir,—I beg respectfully to recommend to the notice of photographers a very simple method of making a copying frame, which I have found perfectly sufficient for pictures even 9 inches large.

The negative and prepared paper (with a double fold of red blotting paper at its back) is placed between two pieces of thick glass—the ordinary strong negative kind answers quite well—and a band of stout india-rubber is stretched around all at each end, and the whole are thus firmly kept in opposition.

If the negative is on strong glass, no additional piece is required over it; but if on a thin sheet or on paper, then the upper glass is needed. A flat piece of wood may be used instead of the lower sheet of glass. This may be either the exact size or of a little larger than the negative. The edges of the glasses should be rounded off with a file, to prevent them cutting the india-rubber band.

I offer these remarks to those not possessing the ordinary expensive printing frames, or who would wish to copy a great number of pictures quickly. The method possesses the advantage of cheapness, and its efficiency may be readily determined.

I am, Sir,
Your obedient Servant,
Robert Dickson, M. R. C. S. E.

CRACKING OF BLACK VARNISH.

To the Editor of the Photographic Journal:

Sir,—During the last year I have taken many collodion pictures, negative and positive. I protected the negative pictures by a coat of Thomas's amber varnish. The positives, so varnished, I backed with bitumen dissolved in mineral naptha. What, think you, was my dismay to find all my positives utterly ruined; cracked into a perfect network! One only of my negatives has gone as yet in the same manner, though I am in great fear that sooner or later they will all go. How am I to protect my collodion pictures, with a certainty that they will not be all spoiled by the cracking of the varnish?

I think this is a matter important enough to demand from you some consideration. We all know the difficulty coachmakers and painters experience in preventing their varnishers from cracking for any length of time. You will greatly oblige by any information on the subject, Yours, O. S. B.

[We should feel greatly obliged for any information on the cause of the cracking of black varnish; it is a source of general complaint, and we regret that we can give no advice in the matter.—Ed. P. J.

From the London Art Journal.

FINE ART IN THE UNITED STATES.

Dear Sir,—I am very glad that the substantial proof which you have received of the good and growing estimation of your beautiful Journal on this side of the water, has awakened so lively an interest among you in respect to the condition of our public taste. The subject, I assure you, well merits all the study which you seem disposed to devote to it; and for my own part, I shall certainly be most happy to assist your inquiry with all the propulsion and power of the heartiest sympathy, and not a little fair opportunity. You may therefore rely upon me as a faithful sentinel, ever watchful for every information and intimation which may help in the wisest dispositiou of the forces you can send to fight with us, under the banner of the Beautiful, against that great Gothic Attila—*Utilitarianism*, which has overrun, and overrules, our country. Assuredly the strength is hers, however scattered and inaetive, for much and true Art achievement; and the good time is, I hope, not far distant, when, with earnest and persistent battle, the present gross and glaring materiality of popular feeling shall be toned and sweetened in the softening shadows of our victorious flag.

We have good soldiers already in the field, and better buckling on their armor, with patriot-prayer and voice enough to second and cheer them on their way. Here, as in other of our larger cities, we have brave regiments of Artists, which, rough troops though they be, for the most part, need only discipline and organization to become a manifest and conquering power in society; while every hamlet within the points of our political triangle—Maine, Texas, and California—has its humble recruiting office in the shape of some little still-vioced studio. Academies of Art, such as they are—and they might be worse and will be better—are growing up about us; and within the circle of a day's journey from my *sanctum*, there are annually held half a dozen very considerable reviews of new, original "works," which the people flock lovingly to see; while but few good pictures, after all the lamentation, go "a begging" for liberal purchasers. Not long ago, one esteemed landscapist, Cropsey (who will have taken up his temporary abode amongst you—to your gratification and our regret—by the time this despatch arrives), sold his accumulated pictures, sketches, and scraps, at public auction, and realised willing thousands where only dubious hundreds had been predicted.

But, returning to the ranks: it is the portrait-painters who are at present doing most execution—taking off the heads of the people; oftentimes, it must be confessed, cruelly enough. And after this irresistible infantry, there comes the light cavalry of the landscapists, successfully carrying Birnam Wood to Dunsinane! What we are most wanting, unfortunately, is the heavy ordinance of history, though now and then a big gun bangs away triumphantly. Mr. Edwin White has lately discharged such a piece effectively, in the shape of an admirable picture of the "Pilgrims signing the compact in the cabin of the May-flower;" Mr. H. P. Gray, another, in a charming "Hagar;" and Mr. H. K. Brown, one of our most able sculptors—though he lives in Brooklyn instead of Florence or Rome—is at this moment erecting a battery in Union Square, from which he will take the town by storm on the coming 4th of July; for he is going to do nothing less than to trot out General Washington himself, mounted on his war-horse, and both grand in bronzed bravery. I must though be serious here for a moment, as the subject is important. A few years ago some liberal-hearted private citizen made up a generous purse to procure for the city a colossal equestrian statue of the country's idol. The commission was entrusted to the joint care of Mr. Greenaugh and Mr. Brown. The lamented death of the former left the task to his colleague alone, and he has accomplished it with a success of which I shall speak hereafter.

I shall endeavor to advise yon in regard to our Art-history, with all profitable observation of present performance, and peep backwards when opportunity may come. At this moment I have sought only to report myself ready for service as your Correspondent here.

Very sincerely yours, T. A. R.

Dear Sir,—I am afraid that it was very rash—the promise which I lately made you, to watch the wide and varied course of Art, Æthetic and Useful, in this great land. The labor grows into most grave magnitude as I come near to it; and I might even now be tempted to shrink from the task, did I not feel its vast importance and worth,—and were it not an inexorable dogma of our national faith to go-ahead when once assured you are right!

Before I can intelligibly follow the daily progress in our studios and manufactories, I must inquire, briefly as may be, into their past and present fortunes. Such a review I shall have an admirable opportunity of making during the coming summer months—the annual interregnum in Art-production; when the ateliers are closed, and their occupants, as the cards on their doors intimate, are "out of town," consulting with the great teacher, Nature, as to their future toils.

In this note I propose to give you such information about the Arts here, as you may be able to gather from a knowledge of their money value in the higher departments. I am very sorry thus to begin with the all-mighty dollar, but it is the truest standard; and whatever "figure" we, as well as you, might cut, would still be but a miserable one, unless led by the magic "$," or by the "£. *s. d.*" As with all other things, so with Art—to know whether it "pays," is to know whether it prospers.

However diffused the political power iu the United States may be, the Art-strength clearly tends towards centralization, and that, in this our chief metropolis, with a partial exception iu respect to portraiture, and in a few notable instances in other departments. At least no *more* can be said of other cities than of this, which may thus speak fairly for all the rest. In our population of half a million there are scarcely less than from five to six hundred painters, sculptors, and engravers, who live solely by the practice of their professions. The greater portion, of course, are men of very moderate ability, and only very moderately known to fame. The "works" of nearly two hundred are from time to time admitted upon the walls of our Academy Exhibitions, and half of these might be entirely excluded with great advantage, while the productions of a yet smaller number only are desirable. The highest prices paid for portraits—and which but few command—are from one hundred and fifty to two hundred dollars for a head, from two hundred to two hundred and fifty with hands, and five hundred and one thousand dollars respectively for half and full-lengths: five hundred and one thousand dollars were once the official prices paid by our city authorities for the portraits of the retiring mayors and state governors, but these fees have, within a few years, been reduced to exactly one half. The painters of course disapproved of this economy, and one of them, when coaxed to compromise the matter, by "doing only what he could afford for the price," grew merry at the order (as he said) for "five hundred dollars-worth of governor!" The corporation, alas! won the day, and their price-current still controls the market. The only retaliation within the power of the artists, and which some of them unfortunately seem careful to make, is not to give *more* than the worth of the money.

When our "city fathers" once upon a time desired Mr. Ex-President Van Buren to sit for his portrait on their account, and to select the artist himself, he went of course to the studio of the late Henry Inman, the leading painter of his time. His work completed, Inman presented his bill, one thousand dollars, to the authorities. The price was disputed; wherenpon the artist cooly replied that it was of no consequenee, as since they declined to pay he would send the account to his sitter, who had ordered the picture. It need not be added that the municipal purse-strings were very speedily loosened. This half-price business is in strict keeping with our government estimation and patronage of Art—excepting only in the instances of the national commissions of ten thousand dollars each, for the eight large historical compositions in the rotunda of the Capitol at Washington, and of a few works of statuary there and elsewhere.

In landseape—the department in which is, and for many

years to come will continue to be, our chief Art-strength and hope—the prices received by some half-dozen of our best men range from fifty to one hundred dollars a study, or a small picture, to five hundred for a canvas four feet by six—the maximum landscape dimensions here: a few works of this size are sold for one thousand dollars, and occasionally for yet larger sums.

The prices of historical and genre-pictures—of which we have comparatively few—run very little above those paid for landscapes. There are in the possession of gentlemen in this State two very large pictures by Leutze, purchased each at the cost of ten thousand dollars.

The collections of the late American Art-Union were purchased at the rates I have indicated. I am speaking now only of the works of a few of the most popular painters—and they are not all overburthened with orders. No fortunes are yet made here at the easel. Two or three thousand dollars a year is a successful income, and five thousand is a marvel. The purchasers of pictures are few in number as yet, and their means are limited. Others will by-and-by be paid for the toil of the artists of to-day—by-and-by, when their works will be resold at double and treble the prices they themselves receive. Of this there is clear indication in the greatly advanced value of good pictures of the past, as they come from time to time under the auctioneer's hammer. The last yearly collection of the American Art-Union, when thus sold—the law having forbidden its distribution by lot as before—brought almost the liberal amount at which it was purchased. I recall here the instance of a certain little picture, which was recently bought by a distinguished gentleman in Washington at ten times the price which the painter received not very long before.

Is there not in all this, promise that the true love of Art lives among us; and that in due season, and under proper circumstances, it will become gloriously manifest?—that with the daily increasing means for the gratification of daily advancing taste, the public estimation and support of the higher Arts will soon grow, even in a greater ratio of progress than that already made in the more useful and practical departments? May not the young men of to-day, even hope to gather their share of the ripening harvest?

But to leave this agreeable future, and to come back to the less inviting present, of which labor and patient waiting are the watchwords. While we have amongst us, happily, a few gentlemen who buy pictures simply for the love they bear them, certainly as yet the greater number of our connoisseurs look only to the vain pleasure of a showy and costly decoration of their parlors and halls; ordering works of Art for this and that especial niche and nook, in precisely the same spirit in which they order fresco flowers and angels for their ceilings, and carpets for their floors. Thus the Art in our drawing-rooms is always well-displayed, and never thrown away in portfolios, unless it be in expensive engravings. Little hidden treasures, which do not astonish the vulgar gaze, and thus minister to the idle vanity and pride of their possessors, are looked upon as unprofitable extravagance. So we have no works and no painters in water-colors, and cannot for the present hope to have any; though a beginning has been made even in this, by a little society of hopeful laborers, from whom we shall, I trust, have good reports before long.

We have very successful annual exhibitions in this and the neighboring cities of Philadelphia and Boston; and as I write, vigorous efforts are being made to establish a similar gallery in Baltimore. The collections of the National Academy of Design, in New York, are the only ones entirely renewed each season. They have now continued without interruption through thirty-one years—the catalogues numbering from four to five hundred items, and the receipts varying from three to five thousand dollars per season of six or eight weeks. In 1826, the first year, the exhibitors were themselves called upon to pay *pro rata*, the costs of the exhibition; during the second season (1827) over five hundred dollars came into the treasury, and ten years later (1837) a no less sum than six thousand two hundred and seventy-eight dollars was received from visitors. Since that time the income greatly decreased; but during the past three years has been gradually coming up again. The financial condition of the Academy was greatly improved recently by an advantageous sale of its galleries; and its real and personal property amounts (without debt) to about one hundred thousand dollars. The available means are soon to be re-employed in the erection of new and more commodious buildings.

Besides the annual exhibitions of the Academy, we possess an excellent beginning of a permanent collection of American pictures, established some years ago under the name of the New York Gallery of Fine Arts. It is closed temporarily from the want of suitable exhibition rooms. Next we have, and have had for a number of years, a collection of German pictures—some hundred and fifty in number—known as the Düsseldorf Gallery. These pictures, which are fair examples of the school to which they belong, were very popular when first exhibited; and with some ups and downs they have kept their place in public favor to the present moment. During the past year the receipts of the Düsseldorf Gallery have averaged about twenty-five dollars per day. The fourth and last permanent exhibition in New York is the Bryan Gallery of Christian Art, a very excellent and most interesting collection of old pictures. But our people do not much affect the old masters (except when they can plaster their walls with them at a cheap rate), and so Mr. Bryan's pictures are displayed chiefly at his own private cost.

For a number of years the attractive and ever-changing galleries of our late Art-Union were a favorite and always thronged resort of all classes of our population.

Besides the exhibitions proper, we see a great many works of Art in the shops of our frame-makers and colormen. Messrs. Williams, Stevens, and Williams, always make an attractive display at their large and elegant establishment in Broadway, giving us from time to time peeps at the works of your own artists. Just opposite to them is the well appointed store of Goupil and Company, where we occasionally obtain sight of a Delaroche, a Vernet, a Scheffer, and other pictures of the French school.

The receipts of the Pennsylvania Academy, in Philadelphia, hardly fall below our own. In 1851 the gross income of sixty-four days amounted to four thousand six hundred and two dollars and seventy-one cents; while that of the current exhibition (the thirty-third) is still larger—more than three thousand dollars having been received during the first thirty-six days. This, too, with the deduction of about six hundred free family-tickets issued to stockholders—for the Pennsylvanian Academy, is a joint-stock institution, controlled by lay as well as by professional members. The real and personal estate of the Pennsylvania Academy (invested in admirable buildings for exhibitions and schools, and in a permanent collection of pictures and statuary) amounts to one hundred and thirty thousand dollars, with a venerable debt of thirteen thousand.

The only gallery supported in Boston is that of the Athenæum—a permanent and an annual exhibition united, as in Philadelphia. The receipts last season were four thousand four hundred and forty-three dollars and thirty cents, an income very much exceeding, thus far, their present year.

In each of the three cities of which I have spoken there is a respectable Art-library, and free schools for the study of the antique and the living model. At the National Academy the roll of students varies in number from twenty to sixty.

One very important means for Art-development, in which we are unhappily quite wanting, is a well-informed and honest criticism.

A few of the leaders of Art-opinions here, who really seem disposed to be honest, have unhappily fallen of late into a most lamentable misunderstanding of the true spirit of the reform in Art which in England you have called Pre-Raphaelism; and instead of urging upon us the importance of that more rigid discipline of eye and hand—that more faithful study of Nature, and that more careful and patient manipulation, which we really so much need, they insist that we shall absolutely eschew all imagination, all poetry, all feeling, and be slavish imitators of

Nature, with no presumptuous preference of her beauties—no choice between "a muller and a mountain."

I forgot to mention in my last letter that it would be accompanied in its voyage across seas by Professor Morse, the illustrious inventor of the electric telegraph. The artists here are especially proud of Professor Morse, as he has successfully gone out like Fulton, from their own ranks into the world of practical scientific achievement. He was the founder, and for twenty years the President, of our National Academy, which office he resigned only when he found himself entirely withdrawn from the profession into other labors. Notwithstanding his triumphs elsewhere, I am sure that he sometimes looks back regretfully to the long years of his former artist-life. Indeed, I once heard him say, at one of our Academy *reunions*, when it was lamented that he so rarely visited the exhibition, "That such visits were always painful to him, as he never found himself among pictures and painters without feeling very much like one who comes into the presence of an old love in the possession of another!"

I am very sincerely yours, T. A. R.

New York, June 21, 1856.

"PATENT" INJUSTICE.

[It would seem by the following, that Uncle Sam's people are not the only victims to patent laws injudiciously granted. The absurd practice of patening every little modification in the photographic art, is becoming more general than wise.—Ed. *P. & F. A. J.*]

Sir,—There is a grevience under which, in Scotland, the professors of photographic portraiture labor, that ought to be thoroughly exposed, and, if possible, by the aid of such journals as your own, as well as by every one interested in the progress of art, a deliverance from the injustice effected; that is, the unfortunate facility with which monopolies are procured by means of the Patent Office.

There should surely be some more perfect machinary at work than appears to be the case, where such powers are granted, to examine into the merit and claims of parties making application for priveleges that may certainly be profitable to themselves, but to which they may not have any real title, and which may hinder other more able practioners from carrying improvements far beyond what the recipients of Government favors are capable of. For instance, two such patents have been granted in Scotland, that may be ealled cruel, in their injustice to the profession and also to the public, from the obstruction they cause to progress in art. Let me describe them. The first grant is in the hands of a practiser in Glasgow, and it is simply this: after a positive on glass is taken, the figure only is carefully painted with black varnish on the uncoated side, and a drawing on paper, representing a landscape or interior, as the case may be, is placed behind, the object desired being to give a forcible relieved-like picture, and which the patentee calls "The Relievo Process." In his hands the results are by no means satisfactory, and I understand it is only useful to himself as an advertising card, and through what he receives from one or two others for licenses to use it. Now, Sir, you will at once agree with me, that there is no invention in the above but what might have occured to any one; nothing surely to warrant an individual in preventing, as long as his powers last, almost everything in the shape of artistic effects being produced on a picture after it is developed (saving the coating of it with a uniform tint, or putting color on its surface),—for to that amount does the terms of his patent enable him to tyranize; and without leave granted, none are permitted to indulge in what is deemed an infringement of his vested rights. The other case is perhaps more absurd. You are aware that since the discovery of collodion positives, it has been the practice of the professors of it to color them on the collodion side of the plate with dry color: attempts have often been made to do so with oil colors, which have generally failed to be satisfactory more from want of skill on the part of the essayist than impraticability in the idea, the hand of a real artist being required. Two artists of my acquaintance have for years been in the habit of doing it with great beauty, but till the other day, no one thought of making it the subject of a patent; now, however, that has been secured by a photographer in Edinburgh, and no artist dare attempt to put oil colors on photographs without first compounding with this party for the privelege. The real discoverers of our beautiful art have been differently influenced in their considerations; and it is indeed a matter of regret that sordid minds have a power, through motives of selfish aggrandisement, to perpetrate such wrong.

I have been prevented from making known an extremely simple but, it appears to me, an importnnt thing in photography by the collodion process, from these considerations. By means of it I can produce on the coated side of the plate a TRUE picture of the subject,—not a reversed one, as has hitherto been necessarily the case,—thus permitting a portrait to be colored (which you are aware can only be done on the surface of the collodion) with everything in its natural position, which I have never yet seen an example of, except by myself. No reflecting mirrors are required;—but as this letter is already too long I shall reserve for another communication a full description of the process. If you consider it, as well as the foregoing, worthy of a space in your valuable Journal, I shall feel obliged by being favored with an opinion from you, if by so doing, any party is prevented from taking out a patent for it; for the above disgraceful facts to which I have alluded, show, that people are to be found ready to appropriate to themselves what does in no way belong to them exclusively.

I am, Sir,
Yours very respectfully,
Alpha.

ON MR. HALE THOMSON'S
New Process for Silvering Glass by Chemical Agency.

There is always something to be learnt from an unsuccessful experiment; indeed a philosopher of distinguished name has said that he advanced his knowledge of the truth, more rapidly by studying his own, and the other men's failures, than by any of those more pleasing and satisfactory results waich are obtained from investigations confirming any preconceived hypothesis.

Glauber said he made his numerous discoveries by examining all those things which other chemists threw away; and we believe, if the history of discovery could be examined through all its phases of progress, that it would be found that the true philosopher was indicated by the patience he displayed in working his way through errors. The man who loses heart when he encounters a few failures, should abandon science, since, its truths are not for him. To *work and wait* is a maxim of vast import, and it applies to every division of human progress. It would appear as if mankind were destined to learn their deficiencies, by being compelled to advance to the light of truth through realms of darkness and ignorance, stumbling over the obstacles which lie around their paths.

Much, however, it must be confessed, of this system of advancing by building ourselves stepping-stones with the blunders over which we have fallen, is to be referred to the very empirical manner in which most men set about their work of investigation. Owing to the errors of our educational system, there is but little of the *science of method* to be detected in our intellectual progress. Most men work in a very random and uncertain manner; trying this and that without having first learnt all that has been already done in relation to the subject they have in hand, or asked themselves why a certain effect should be expected to result from a combination of certain causes, of which they have no clear conception, or of which they have no defined idea of the *modus operandi*.

It is to be hoped and expected, that with the improvements which have been, and which will be, introduced into our system of University Education, and which are slowly finding their

way into our scholastic system generally, the law of progress will be more regular than it has hitherto been, and that the deviations from the strict line of induction will be less numerous, and fall within narrower limits.

With these ideas we echo the words of Longfellow—

> "Let us then be up and doing,
> With a heart for any fate
> Still achieving, still pursuing,
> Learn to labor and to wait."

In the *Art-Journal* for 1848, page 325, will be found an article on "*Drayton's Patent Process of Silvering Glass*," of which, at that time, we entertained the most favorable opinion. Many of the results obtained by Drayton were exceedingly beautiful; the brilliancy of many of his reflecting surfaces could not be excelled. The process appeared to be in most respects certain; its economy was calculable, and its advantages many. Yet, as a practical application of science, it commercially failed, through a rather curious, and, in many respects, an interesting cause. To those who may not be familiar with the process to which we allude, or who may not be enabled conveniently to refer to the former paper, it is necessary that we should give a brief description of the operation.

A solution of nitrate of silver, rendered neutral by the addition of a little ammonia, was floated over a plate of glass; or a vessel intended to be silvered, was filled with this fluid; some spirits of wine was mixed with it, and then a small quantity of the oils of cloves and cassia added. By a complicated action, partly physical and partly chemical, metallic silver was separated from the salt in solution, and precipitated over the entire surface of the glass. The metallic film being of sufficient thickness, the solution was poured off, the coating well washed, dried, and protected from abrasion or the action of the atmosphere, by a thick varnish or paint laid upon the back.

It was curious, after having placed in a glass a transparent solution, to observe images through it; and to see those gradually become less and less distinct; and eventually, for a reflecting surface to shut out those images, and to be presented with a faithful one of our own features instead.

Barometer-makers, looking-glass manufacturers, and, indeed, all who have to handle mercury in large quantities, are subject to diseases of a very distressing character. With the diseases of workmen we have dealt in a recent number, (*Art-Journal*, No. 151), but our remarks did not then include the diseases produced by the use of mercury in the Arts and Manufactures.

By the process of electro-plating we have nearly abandoned the injurious operations of gilding with the amalgam of gold, and when Drayton's process was published to the world, we hoped that the use of the amalgam of mercury and tin-foil, for the purpose of *silvering* mirrors, (as it is not very correctly termed), would also be continued. Up to the present period, however, these hopes have not been realized, owing principally to a defect in the silvering produced by precipitation.*

It was discovered after the silver had been precipitated by Mr. Drayton's process, that although it might have been quite free from any imperfection at first, there gradually appeared small specks in the silver, which became little centres of chemical action, the silver tarnishing, and circular spots extending from those points; so that the mirror, either for use or ornament, was ruined. The cause of this may be traced to the compound character of the solutions employed. Nitrate of silver, ammonia, spirits of wine, oil of cloves, oil of cassia, and water, from a somewhat incompatible, and certainly a very unchemical mixture. Those hydro-carbon compounds, the essential oils, were the chief reducing agents; and, as the silver fell, it carried down with it a portion of the organic matter of these oils, and this, however small, became the starting point of those stains which destroyed the reflecting surface.

When the article was written to which we have already referred, in 1848, a number of experiments were made, as to the action of several other agents which were known to have a reducing power on many metallic salts. Mr. Stenhouse, then of Glasgow, who is now about to occupy the chemical chair at the College of Civil Engineers, at Putney, also published a paper in the Memoirs of the Chemical Society, in which he gave a list of a great many articles which had the property of precipitating silver from its solution. Gum-arabic, starch, salicine, gum-guaiacum, saccharic acid and Aldehyde were there named, as were also the essential oils of Pimento, turpentine, laurel,—and the peculiar property of grape-sugar was particularly named. Upon this last substance Mr. Stenhouse had instituted a great number of experiments, which were clearly the first indications of its use as now included in the patent process of Mr. Thomson, of which we shall presently have to speak.

Aldehyde, as exhibiting the property of precipitating the metals, gold and silver, in the most remarkable manner, deserves some further attention than we gave it in the former article. This preparation may be regarded as an oxidized alcohol. It may be directly prepared from spirits of wine by the action of nitric acid; it is procured in considerable quantity by the destructive distillation of wood; but to obtain the Aldehyde pure, it is necessary to submit the pyroxilic spirit, or wood naphtha, to a process of rectification: The following is, however, by far the easiest process for obtaining this compound. Two pints of spirits of wine are mixed with three pounds of bichromate of potash, three of oil of vitriol, and six of water, the two last being previously mixed and allowed to cool. These are to be placed in a capacious glass retort, and distilled at a very gentle heat, the condensor being kept cold by ice or a freezing mixture.

Adehyde, thus prepared, is a colorless fluid, with a peculiar suffocating odor. Whenever it comes in contact with oxidizing agents it is changed into acetic acid, passing, through the stage of *Aldehydic acid*; it is during these changes that its power of precipitating the metals is displayed.

If into a solution of ammoniacal nitrate of silver in a glass, some Aldehide is added, it slowly occasions the precipitation of the metallic silver in a very brilliant film. and if a very gentle heat is applied, the process is greatly quickened. By the action of Aldehyde upon the oxide of silver, an *Aldehydate of silver*—a soluble salt—may be formed; if to this is added a solution of potash, a film of oxide of silver is produced, which, if gentle warmed, is very readily converted into metallic silver of great brilliancy. The cost of the Aldehyde appears to be the only reason for its not being employed as the precipitating agent. It would, however, in many cases, where the expense was not an object, appear to offer advantages superior to nearly all other preparations, particularly as the silver which it throws down is singularly white and lustrous.

An alkaline solution of gun-cotton possesses the same property. This is not expensive, but some niceties of manipulation which are required in the preparation of the solution, and some danger attending the preparation of the gun-cotton in the first instance, has prevented its being employed.

Grape Sugar is, however, the article which Mr. Hale Thompson employs in his patent process. The distinctions between grape and cane sugar not being commonly known, it will not be uninteresting so point out briefly the chemical differences.

Cane Sugar is familiarly known as the produce of the sugar-cane, root the beet-root, and the maple; its chemical composition in its crystalline state being:—

Carbon	12
Hydrogen	9
Oxygen	9
Water	2

Grape sugar is widely diffused through the vegetable kingdom; the crystallized saccharine matter in raisins and figs being the

* In the last number of this Journal, Mr. Langston Scott has denied the injurious influences which I believed were found to affect the men employed in white zinc works. I have seen the certificate signed by all Mr. Scott's workmen, to the effect that they enjoy perfect health in his manufactory, which is most satisfactory. At the same time, we must not forget that this is due, in Mr. Scott's works, to the care which is taken to prevent the escape of the oxide of zinc during the process of sublimation. Where the manufacture is carried on with less care, I should still be disposed to believe that injurious effects may arise.—R. H.

most familiar examples of this variety. It differs from cane-sugar in its composition as follows:—

Carbon	12
Hydrogen	11
Oxygen	11
Water	3

This is sometimes called *Glucose*, and is often prepared from raisins or honey, by digestion with strong cold alcohol, to remove the uncrystallizable sugar, and then expressing the residue, dissolving it in water, and neutralizing it by chalk. After this it is clarified by albumen, and evaporated to the point of crystalisation.

Bracconot, some years since, pointed out the very remarkable fact that saw-dust and linen could be converted into grape sugar; and that from a pound of these substances more than a pound of sugar could be produced. The process is as follows:—

Wood, or linen, or paper, are left to imbibe their own weight of oil of vitriol; eventually the whole is converted into a viscid mass; care must be taken that it does not become too hot. This mass being diluted with water is boiled for some hours, the liquor is filtered, the acid removed by chalk, and the sugar crystallized out after evaporation.

One hundred pounds of saw-dust yield by this treatment, one hundred and fifteen pounds of sugar; the same quantity of starch may be converted, by a similar operation, into one hundred and six pounds of saccharine matter. These substances only differ chemically from each other by an addition of a small quantity of hydrogen and oxygen, the elements of water to the latter. The quantity of carbon remains through all the same, but the proportion of the two gaseous elements are increased by the process described.

This agent, which, from its remarkable properties, we have been somewhat careful in describing, is the substance employed by Mr. Hale Thomson in silvering glass under his patent, which differs from Drayton's process only in his substitution of sugar for essential oils. The saccharine matter is mixed with the argentiferous solution in the article to be silvered, and the deposit is effected over every part by the operation of that power which occasions the condensation of all bodies, in the fluid or gaseous state, or such as are passing from those coditions into the solid form upon material surfaces.

Mr. Drayton was in the habit of employing the Bohemian or German glass for his process, and of protecting it from atmospheric influences by an opaque varnish, by which a certain amount of dulness was communicated to the reflecting surface. We are not at all prepared to say that we have not seen glass silvered by Mr. Drayton, which was quite equal to any of the specimens which we have examined of Mr. Hale Thompson's at Mr. Mellish's establishment, in Regent-street. Experience has, however, proved that the process by grape sugar is free from the objection of the essential oils, and the silver precipitating free of organic matter is not liable to those tarnishing spots which we have already described. There is a peculiarity in the manufacture of the glass employed by the present patentee, which merits particular description, from its novelty and ingenuity.

All the articles are made with hollow sides; goblets, vases, &c., have all double sides, and every other article in glass which is silvered is made hollow. By this means the solution is poured in between the two walls of glass, and precipitated on both sides, so that we have a mirror surface produced both within and without the goblets or vases. This enables the manufacturer to improve the appearance of his article. As the inner part of the goblet is made of briliant yellow glass, the tint varying as iron, or silver or charcoal is employed, this, when silvered, looks as if it were gilded and we have the effect of a silver cup gilt within. The colors employed in the manufacture of the glass, which we understand is from the glasshouse of Messrs. Powell & Co., are of the most beautiful description; with the gold ruby we have been particularly struck. A very ingenious optical deception adds much to the beauty of many of the specimens. Before the two parts of the glass are combined, which is a secondary process, one of them, and often both, are engraved upon what will be their enclosed and silvered sides. When these are brought together and united, which is not so difficult a process as it at first appears to be, and the interior is silvered, those engraved parts, reflecting the light from different angles to the eye, assume the appearance of embossed surfaces, the relief in many instances being very remarkable. The touch, however, proves that the exterior is a perfectly smooth surface.

Professor Donaldson has proposed to use this material for the purposes of house decoration, and particularly as a gorgeous substance for shop fronts. It would produce, if judiciously applied, many very striking effects, and as the Professor truly says, the tones of color are so curiously new in many of their combinations, that we know of no other agency by which our chromatic scale may be increased. In every example—the silvering process being completed—the solution is poured out, the interior well washed from all saccharine matter, and then thoroughly dried; the interior is then hermetically sealed, and thus preserved from tarnishing under any of those atmospheric influences which prevail in even densely crowded and manufacturing cities. This process would appear to be as near an approach to perfection as can be expected, and we regard it as in every respect a vast improvement upon that of Mr. Drayton—although to him we must ascribe the merit of an inventor. Much has been said of the silvered globes—we are not disposed to consider these as the best illustrations of the process. Undoubtedly, many of them have very brilliant reflecting surfaces, but the effect of a reflecting sphere is never pleasing, and the distortion of the reflected images has often a very disagreeable effect. In the vases, and the numerous articles of utility, made in a great variety of colors, we have certainly examples of great improvement in our glass manufacture; and superadded to this, the new tones of color produced by the two reflections, first from the glass surface, and then from the silver itself.

Much difficulty may stand in the way of producing elegant forms in this double glass—but this, in some examples, is to a great extent overcome—and we may fairly infer from what has been already done, that every month will bring out better results, and lead us nearer to that symmetry of design which may add to the charm of color in these productions. We have not yet seen any silvered plane surfaces. We understand such are in the process of manufacture; and we hope, on the score of humanity, superadded to the increased brilliancy of reflection, to see this process soon applied to the manufacture of looking-glasses. The patentees contemplate, we understand, the manufacture of reflectors for astronomical purposes;—the double reflection would we fear be fatal to this; for lighthouse reflectors it might answer admirably. ROBERT HUNT.

PERMANENCE OF DAGUERREOTYPES.

To the Editor of the Photographic Journal:

Liverpool, May 10, 1856.

SIR,—A letter appeared in your February Number signed J. Fedarb, calculated I think to convey an erroneous impression of the permanence of daguerreotope pictures. Your correspondent stated that he had seen a picture by Beard "Which had very much faded;" that on its examination he discovered that it had been injured and destroyed by acari, and subsequently that the deposition of gold is not a permanent preservative. These opinions are so directly opposed to my own experience and convictions, that I am induced as the *quondam* partner of Mr. Beard and his successor in these regions, to offer, even after this lapse of time, a remark or two in deprecation.

The instance given of injury effected by external causes I cheerfully concede as probable enough. The inferences drawn from the instance—the summer built on this swallow's back—I offer the results of long experience to controvert. Twelve years' practice has never disclosed to me one instance of a 'faded daguerreotype.' Pictures have been returned that have made the circuit of the globe oftener than Capt. Cook, that have been to more remote places than Owyhee. From wrecks and burn-

ings and castaways, by the laws of 'Flotsam and Jetsam,' with the influence of sea-water on them, with the marks of fire—from the Orion, the Birkenhead, the Amazon, and the Taylenr—from long sojourn above the seventeenth cataract—from trafficking at Bonny River, in the exigencies of the palm-oil trade—from the pocket, it may have been, of the King of Oude, and from the Polar seas—places as remote as the geography of Bishop Heber's hymn,—pictures have been returned to be cleaned, but never one had faded or decayed. In various stages of dilapidation and in great poverty of external appearance, they have come back like prodigal children to be reclaimed and clothed, but little changed in nature or disposition by their long travel.

The charge of 'fading' is nevertheless a very familiar one with me; every day a picture is brought back in primordial state of dismemberment; glass broken, case lost, plate subjected to the frictional exercises of industrious house-maids, or to the energetic exercitations of young gentlemen engaged in cutting their teeth, who have used the silver plate in a manner never contemplated by M. Daguerre—and the charge is *always* the same: the picture has faded. Not merely the dead, but the marrowless bones are displayed, and the moralizing is always the same: "To this complexion must we (if daguerreotype) come at last." The picture has not intrinsically changed, it has simply been destroyed; and it would be as just to use the term 'faded' of Sebastopol, and say that Sebastopol had faded, the assault and battery not being considered, as that the dagnerreotype has faded. My conviction founded on the evidence of its production, is that a daguerreotype cannot by any possibility fade; that that standing classic image of wondcrous rarity, the black swan, so frequently adjured in flights of eloquence, 'fades' into the obscurity of antiquated mythological belief when compared as a marvel with a faded daguerreotype.

In conclusion, there are pictures badly fixed—there are pictures tarnished by contact with metal heats,—which merely require a little moisture to establish a partnership with the silver plate, with unlimited liability in galvanic action, for the deposition of copper and the decomposition of the gold. There are, moreover, pictures covered with smoke, with dust, dimmed by sulphurous and carbonaneous exhalations, and most marvellonsly battered in various ways, which by a very simple process of reasoning and classification, are said to have faded.

My belief I would reiterate, that there never was a faded daguerreotype, and that the image written by light on the tablet of silver fixed by the alchemical agency of gold and mereury is, in its own nature, eternal.

I remain, Sir,

Your obedieet Servant,

J. T. Foard.

THE STEREOSCOPE
Its History, Theory, and Construction.*

BY SIR DAVID BREWSTER.

CHAPTER IV.

DESCRIPTION OF THE OCULAR, THE REFLECTING, AND THE LENTICULAR STEREOSCOPES.

Although it is by the combination of two plane pictures of an object, as seen by each eye, that we see the object in relief, yet the relief is not obtained from the mere combination or superposition of the two dissimilar pictures. The superposition is effected by turning each eye upon the object, but the relief is given by the play of the optic axes in uniting, in rapid succession, similar points of the two pictures, and placing them, for the moment, at the distance from the observer of the point to which the axes converge. If the eyes were to unite the two images into one, and to retain their power of distinct vision, while they lost the power of changing the position of their optic axes, no relief would be produced.

This is equally true when we unite two dissimilar photographic pictures by fixing the optic axes on a point nearer to or farther from the eye. Though the pictures apparently coalesce, yet the relief is given by the subsequent play of the optic axes varying their angles, and converging themselves successively upon, and uniting, the similar point in each picture that correspond to different distances from the observer.

As very few persons have the power of thus uniting, by the, eyes alone, the two dissimilar pictures of the object, the stereoscope has been contrived to enable them to combine the two pictures, but it is not the stereoscope, as has been imagined, that gives the relief. The instrument is merely a substitute for the muscular power which brings the two pictures together. The relief is produced, as formerly solely by the subsequent play of the optic axes. If the relief were the effect of the apparent union of the pictures, we should see it by looking with one eye at the combined binocular pictures—an experiment which could be made by optical means; but we should look for it in vain. The combined pictures would be as flat as the combination of two similar pictures. These experiments require to be made with a thorough knowledge of the subject, for when the eyes are converged on one point of the combined picture, this point has the relief, or distance from the eye, corresponding to the angle of the optic axes, and therefore the adjacent points are, as it were, brought into a sort of indistinct relief along with it; but the optical reader will see at once that the true binocular relief cannot be given to any other parts of the picture, till the axes of the eyes are converged upon them. These views will be more readily comprehended when we have explained, in a subsequent chapter, the theory of stereoscopic vision.

The Ocular Stereoscope.

We have already stated that objects are seen in perfect relief when we unite two dissimilar photographic pictures of them, either by converging the optic axes upon a point so far in front of the pictures or so far beyond them, that two of the fenr images are combined. In both these cases each picture is seen double, and when the two innermost of the four, thus produced, unite, the original object is seen in relief. The simplest of these methods is to converge the optical axes to a point nearer to us than the pictures, and this may be best done by holding up a finger between the eyes and the pictures, and placing it at such a distance that, when we see it single, the two innermost of the fonr pictures are united. If the finger is held up near the dissimilar pictures, they will be slightly doubled, the two images of each overlapping one other; but by bringing the finger nearer the eye, and seeing it siugly and distinctly, the overlapping images will seperate more and more till they unite. We have, therefore made our eyes a stereoscope, and we may, with great propriety, call it the *Ocular Stereoscope*. If we wish to magnify the picture in relief, we have only to use convex spectacles, which will produce the requisite magnifyiug power; or what is still better, to magnify the united pictures with a powerful reading-glass. The two single images are hid by advancing the reading-glass, and the other two pictures are kept united with a less strain upon the eyes.

As very few people can use their eyes in this manner, some instrumental auxiliary became necessary, and it appears to us strange that the simplest method of doing this did not occur to Mr. Elliot and Mr. Wheatstone, who first thought of giving us the help of an instrument. By enabling the left eye to place an image of the left hand picture upon the righ hand picture, as seen by the naked eye, we should have obtained a simple instrument, which might be called the *Monocular Stereoscope*, and which we shall have occasion to describe. The same contrivance applied also to the right eye, would make the instrument *Binocular*. Another simple contrivance for assisting the eyes would have been to furnish them with a minute opera-glass, or a small astronomical telescope about an inch long, which, when held in the hand or placed in a pyramidal box, would unite the dissimilar pictures with the greatest facility and perfection. This form of the stereoscope will be afterwards described under the name of the *Opera-Glass Stereoscope*.

* Continued from page 274, vol. ix. No. ix.

Description of the Ocular Stereoscope.

A stereoscope upon the principle already described, in which the eye alone is the agent, was contrived, in 1834, by Mr. Elliot, as we have already had occasion to state. He placed the binocular pictures described in Chapter I., at one end of a box, and without the aid either of lenses or mirrors, he obtained a landscape in perfect relief. I have examined this stereoscope,

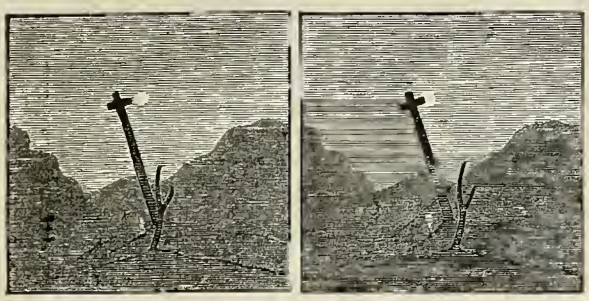

Fig. 8.

and have given, in Fig. 8, an accurate though reduced drawing of the binocular pictures executed and used by Mr. Elliot. I have also united the two original pictures by the convergency of the optic axes beyond them, and have thus seen the landscape in true relief. To delineate these binocular pictures upon stereoscopic principles was a bold undertaking, and establishes, beyond all controversy, Mr. Elliot's claim to the invention of the ocular stereoscope.

If we unite the two pictures in Fig. 8, by converging the optic axes to a point *nearer* the eye than the pictures, we shall see distinctly the stereoscopic relief, the moon being in the remote distance, the cross in the middle distance, and the stump of a tree in the foreground,

If we place the two pictures as in Fig. 9, which is the position they had in Mr. Elliot's box, and unite them, by looking at a point beyond them we shall also observe the stereoscopic relief. In this position Mr. Elliot saw the relief without any

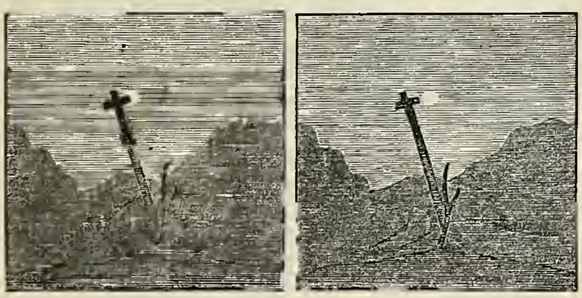

Fig. 9.

effort, and even without being conscious that he was not viewing the pictures under ordinary vision. This tendency of the optic axes to a distant convergency is so rare that I have met with it only in one person.

As the relief produced by the union of such imperfect pictures was sufficient only to shew the correctness of the principle, the friends to whom Mr. Elliot shewed the instrument thought it of little interest, and he therefore neither prosecuted the subject, nor published any account of his contrivance.

Mr. Wheatstone suggested a similar contrivance, without either mirrors or lenses. In order to unite the pictures by converging the optic axes to a point between them and the eye, he proposed to place them in a box to hide the lateral image and assist in making them unite with the naked eyes. In order to produce the union by looking at a point beyond the picture, he suggested the use of "a pair of tubes capable of being inclined to each other at various angles," the pictures being placed on a stand in front of the tubes. These contrivances, however, though auxiliary to the use of the naked eyes, were superseded by the Reflecting Stereoscope, which we shall now describe.

Description of the Reflecting Stereoscope.

This form of the stereoscope, which we owe to Mr. Wheatstone, is shewn in Fig. 10, and is described by him in the following terms:—"AA' are two plane mirrors, (whether of glass or metal is not stated,) about four inches square, inserted in frames, and so adjusted that their backs form an angle of 90° with each other; the mirrors are fixed by their common edge against an upright B, or, which was less easy to represent in the drawing against the middle of a verticle board cut away in such a manner as to allow the eyes to be placed before the two mirrors. C, C' are two sliding boards, to which are attached the upright boards D, D' which may thus be removed to different distances from the mirrors. In most of the experiments hereafter to be detailed it is necessary that each upright board shall be at the same distance from the mirror which is opposite to it. To facilitate this double adjustment, I employ a right and a left-handed wooden screw, *r*, *l;* the two ends of this compound screw pass through the nuts *e*, *e'* which are fixed to the lower parts of the upright boards D, D, so that by turning the screw pin *p* one way the two boards will approach, and by turning them the other they will recede from each other, one always preserving

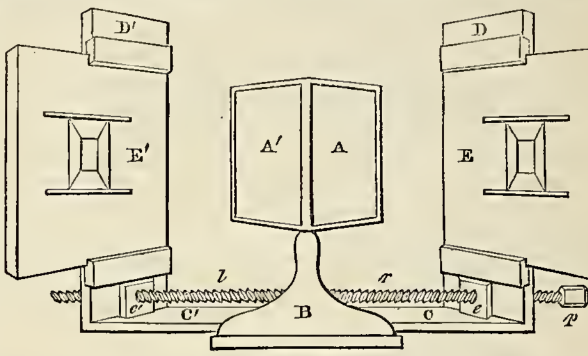

Fig. 10.

the same distance as the other from the middle line *f;* E, E' are pannels to which the pictures are fixed in such manner that their corresponding horizontal lines shall be on the same level; these pannels are capable of sliding backwards or forwards in grooves on the upright boards D, D'. The apparatus having been described, it now remains to explain the manner of using it. The observer must place his eyes as near as possible to the mirrors, the right before the right-hand mirror, and the left eye before the left-hand mirror, and he must move the sliding pannels E, E' to or from him till the two reflected images coincide at the intersection of the optic axes, and form an image of the same apparent magnitude as each of the component pictures. The pictures will, indeed, coincide when the sliding pannels are in a variety of different positions, and consequently, when viewed under different inclinations, of the optic axes but there is only one position in which the binocular image will be immediately seen single, of its proper magnitude, and without fatigue to the eyes, because in this position only the ordinary relations between the magnitude, of the pictures on the retina, the inclination of the optic axes, and the adaptation of the eye to distinct vision at different distances, are preserved. In all the experiments detailed in the present memoir I shall suppose these relations to remain undisturbed, and the optic axes to converge about six or eight inches before the eyes.

"If the pictures are all drawn to be seen with the same inclination of the optic axes the apparatus may be simplified by omitting the screw *rl*, and fixing the upright boards D, D' at the proper distance. The sliding pannels may also be dispensed with, and the drawings themselves be made to slide in the grooves."

The figures to which Mr. Wheatstone applied this instrument were pairs of outline representations of objects of three dimensions such as a cube, a cone, the frustum of a square pyramid, which is shewn on one side of E, E' in Fig. 10, and in other figures; and he employed them, as he observes, "for the purpose of illustration, for had either shading or coloring been in-

troduced it might be supposed that the effect was wholly or in part due to these circumstances, whereas, by leaving them out of consideration, no room is left to doubt that the entire effect of relief is owing to the simultnous perception of the two monocular projections, one on each retina."

"Careful attention," he adds, "would enable an artist to draw and paint the two component pictures, so as to present to the mind of the observer, in the resultant perception, perfect identity with the object represented. Flowers crystals, busts, vases, instruments of various kinds, &c., might thus be represented, *so as not to be distinguished by sight from the real objects themselves.*"

This expectation has never been realized, for it is obviously beyond the reach of the highest art to draw two copies of a flower or a bust with such accuracy of outline or color as to produce "perfect identity," or anything approaching to it, "with the object represented."

Photography alone can furnish us with such representations of natural and artificial objects; and it is singular that neither Mr. Elliot nor Mr. Wheatstone should have availed themselves of the well-known photographic process of Mr. Wedgewood and Sir Humphry Davy, which, as Mr. Wedgewood remarks, wanted only "a method of preventing the unshaded parts of the delineation from being colored by exposure to the day, to render the process as useful as it is elegant." When the two dissimilar photographs were taken they could have been used in the stereoscope in candle light, till they disappeared, or permanent outlines of them might have been taken and colored after nature.

Mr. Fox Talbot's beautiful process of producing permanent photographs was communicated to the Royal Society in January 1839, but no attempt was made till some years later to make it available for the stereoscope.

In a chapter on binocular pictures, and the method of executing them in order to produce, with perfect accuracy, the objects which they represent, we shall recur to this branch of the subject.

Upon obtaining one of these reflecting stereoscopes as made by the celebrated optician, Mr. Andrew Ross, I found it to be very ill adapted for the purpose of uniting dissimilar pictures, and to be imperfect in various respects. Its imperfections may be thus enumerated:—

1. It is a clumsy and unmanageable apparatus, rather than an instrument for general use. The one constructed for me was $16\frac{1}{2}$ inches long, 6 inches broad, and $8\frac{1}{2}$ inches high.

2. The loss of light occasioned by reflection from the mirrors is very great. In all optical instruments where images are to be formed, and light is valuable, mirrors and specula have been discontinued. Reflecting microscopes have ceased to be used, but large telescopes, such as those of Sir W. and Sir John Herschel, Lord Rosse, and Mr. Lassel, were necessarily made on the reflecting principal, from the impossibility of obtaining plates of glass of sufficient size.

3. In using glass mirrors, of which the reflecting stereoscope is always made, we not only lose much more than half the light by the reflections from the glass and the metallic surface, and the absorbing power of the glass, but the images produced by reflection are made indistinct by the oblique incidence of the rays, which seperates the image produced by the glass surface from the more brilliant image produced by the metallic surface.

4. In all reflections, as Sir Isaac Newton states, the errors are greater than in refraction. With glass mirrors in the stereoscope, we have *four* refractions in each mirror, and the light transmitted through *twice* the thickness of the glass, which lead to two sources of error.

5. Owing to the exposure of the eye and everypart of the apparatus to light, the eye itself is unfitted for distinct vision, and the binocular pictures become indistinct, especially if they are Daguerreotypes,* by reflecting the light incident from every part of the room upon their glass or metallic surface.

6. The reflecting stereoscope is inapplicable to the beautiful binocular slides which are now being taken for the lenticular stereoscope in every part of the world, and even if we cut in two those on paper and silver plate, they would give, in the reflecting instrument, *converse* pictures, the right-hand-part of the picture being placed on the left-hand side, and *ice-versa.*

7. With transparant binocular slides cut in two, we could obtain pictures by reflection that are not converse; but in using them, we would require to have two lights, one opposite each of the pictures, which can seldom be obtained in daylight, and which it is inconvenient to have at night.

Owing to these and other causes, the reflecting stereoscope never came into use, even after photography was capable of supplying binocular pictures.

As a set-off against these disadvantages, it has been averred that in the reflecting stereoscope we can use larger pictures, but this, as we shall shew in a future chapter, is altogeth an erroneous assertion.

Description of the Lenticular Stereoscope.

Having found that the reflecting stereoscope, when intended to produce accurate results, possessed the defects which I have described, and was ill fitted for general use, both from its size and its price, it occurred to me that the union of the dissimilar pictures could be better effected by means of lenses, and that a considerable magnifying power would be thus obtained, without any addition to the instrument.

If we suppose A, B, Fig. 11, to be two portraits,—A a portrait of a gentleman, as seen by the left eye of a person viewing him at the proper distance and in the best position, and B his portrait

A C B

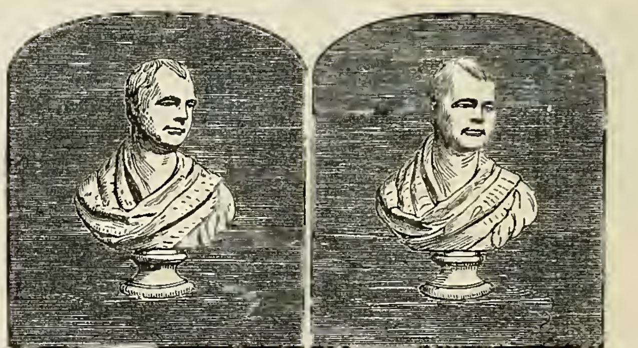

Fig. 11.

as seen by the right eye, the purpose of the stereoscope is to place these two pictures, or rather their images, one above the other. The method of doing this by lenses may be explained, to persons not acquainted with optics, in the following manner:—

If we look at A with one eye through the *centre* of a convex glass, with which we can see it distinctly at the distance of 6 inches, which is called its *focal distance*, it will be seen in its place at A. If we now move the lens from *right to left*, the image of A will move towards B; and when it is seen through the *right*-hand edge of the lens, the image of A will have reached the position C, half-way between A and B. If we repeat this experiment with the portrait B, and move the lens from *left to right*, the image of B will have reached the position C. Now, it is obviously by the *right*-hand half of the lens that we have transferred the image of A to C, and by the *left*-hand half that we have transferred the image B to C. If we cut the lens in two, and place the halves—one in front of each picture at the distance of $2\frac{1}{2}$ inches—in the same position in which they were when A was transferred to C and B to C, they will stand as in Fig. 12, and we shall see the portraits A and B united into one at C, and standing out in beautiful relief,—a result which will be explained in a subsequent chapter.

The same effect will be produced by quarter lenses, such as those shewn in Fig. 13. These lenses are cut into a round or square form, and placed in tubes, as represented at R, L in Fig. 14. which is a drawing of the *Lenticular Stereoscope.*

This instrument consists of a pyramidal box, Fig. 14, black-

* Mr. Wheatstone himself says, "that it somewhat difficult to render the two Daguerreotypes equally visible."—*Phil. Trans*, 1852, p. 6.

ened inside, and having a lid, C D, for the admission of light when required. The top of the box consist of two parts, in one of which is the right-eye tube, R, containing the lens G, Fig. 13, and in the other the left-eye tube, L, containing the lens H. The two parts which hold the lenses, and which form the top of the box, are often made to slide in grooves, so as to suit different persons whose eyes, placed at R, L, are more or less distant. This adjustment may be made by various pieces of mechanism. The simplest of these is a jointed parallelogram moved by a screw forming its longer diagonal, and working in nuts fixed on the top of the box, so as to seperate the semi-lenses, which follow

Fig. 12.

the movements of the obtuse angles of the parallelogram. The tubes R, L move up and down, in order to suit eyes of different focal lengths, but they are prevented from turning round by a brass pin, which runs in a groove cut through the moveble tube. Immediately below the eyetubes R, L, there should be a groove, G, for the introduction, of convex or concave lenses, when required for very long-sighted or short-sighted persons, or for colored glasses and other purposes.

Fig. 13.

If we now put the slide A B, Fig. 11, into the horizontal opening at S, turning up the sneck above S to prevent it from falling out, and place ourselves behind R, L, we shall see by looking through R with the right eye and L with the left eye, the two images A B united in one, and in the same relief as the living person whom they represent. No portrait ever painted, and no statue ever carved, approximate in the slightest degree to the living reality now before us. If we shut the right eye R we see with the left eye L merely the portrait A, but it has sunk into a flat picture, with only *monocular relief*. By closing the left eye we shall see merely the portrait B, having, like the other, only monocular relief, but a relief greater than the best-painted pictures can possibly have, when seen even with one eye. When we open both eyes, the two portraits instantly start into all the roundness and solidity of life.

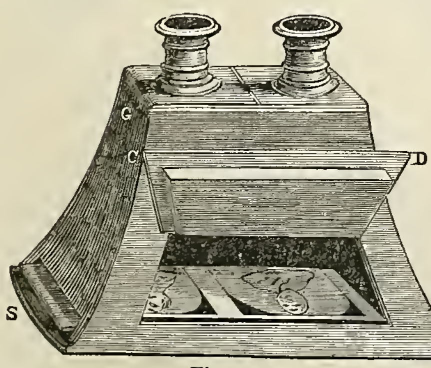

Fig. 14.

Many persons experience a difficulty in seeing the portraits single when they first look into a stereoscope, in consequence of their eyes having less power than common over their optic axes, or from their being more or less distant than two and a half inches, the average distance. The two images thus produced frequently disappear in a few minutes, though sometimes it requires a little patience and some practice to see the single image. We have known persons who have lost the power of uniting the images, in consequence of having discontinued the use of the instrument for some months; but they have always acquired it again after a little practice.

If the portraits or other pictures are upon opaque paper or silver-plate, the stereoscope, which is usually held in the left hand, muss be inclined so as to allow the light of the sky, or any other light, to illuminate every part of the pictures. If the pictures are on transparant paper or glass, we must shut the lid C D, and hold up the stereoscope against the sky or the artificial light for which purpose the bottom of the instrument is made of glass finally ground on the outside, or has two openings, the size of each of the binocular pictures, covered with fine paper.

In using the stereoscope the observer should always be seated, and it is very convenient to have the instrument mounted like a telescope, upon a stand, with a weight and pully for regulating the motion of the lid C D.

The lenticular stereoscope may be constructed of various materials and in different forms. I had them made originally of card-board, tin-plate, wood, and brass; but wood is certainly the best material when cheapness is not an object.

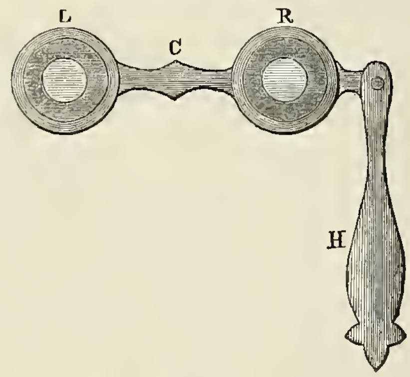

Fig. 15.

One of the earliest forms which I adopted was that which is shewn in Fig. 15, as made by Mr. Duboscq in Paris and which may be called *stereoscopic spectacles*. The two-eye lenses L, R are held by the handle H, so that we can, by moving them to or from the binocular pictures, obtain distinct vision and unite them in one. The effect, however, is not so good as that which is produced when the pictures are placed in a box.

The same objection applies to a form otherwise more convenient, which consists in fixing a cylindrical or square rod of wood or metal to C, the middle point between L and R. The binocular slide having a hole in the middle between the two pictures is moved along this rod to its proper distance from the lenses.

Another form, anologous to this, but without the means of

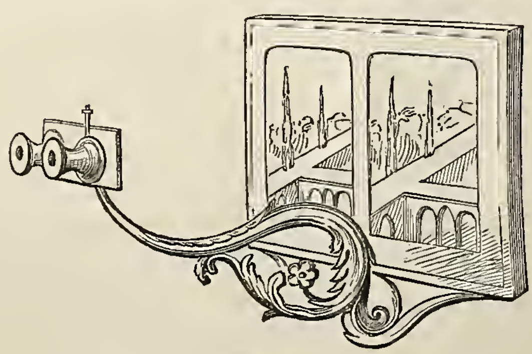

Fig. 16.

moving the pictures, is shewn in Fig. 16, as made by M. Duboscq. The adjustment is effected by moving the eye-pieces in their respective tubes, and by means of a screw-nut, shewn above the eye-pieces, they can be adapted to eyes placed at different

distances from one another. The advantage of this form, if it is an advantage, consists in allowing us to use larger pictnres than can be admitted into the box-stereoscope of the usual size. A box-stereoscope, however, of the same size, would have the same property and other advantages not possessed by the open instrument.

Another form of the lenticular stereoscope, under the name of the cosmorama stereoscope, has been adopted by Mr. Knight. The box is rectangular instead of pyramidal, and the adjustment to distinct vision is made by pulling out or pushing in a part of the box, instead of the common and better method of moving each lens seperately. The illumination of the pictures is made in the same manner as in the French instrument, called the cosimorama, for exhibiting dissolving views. The lenses are large in snrface, which, without any reason, is snpposed to facilitate the view of the binocular pictures, and the instrument is supported in a horizontal position upon a stand. There is no contrivance for adjusting the distance of the lenses to the distance between the eyes, and owing to the quantity of light which gets into the interior of the box, the stereoscopic picture is injured by false reflections, and the sensibility of the eyes diminished. The exclusion of all light from the eyes, and of every other light from the picture but that which illuminates it, is essentially necessary to the perfection of stereoscopic vision.

When by means of any of these instruments we have succeeded in forming a single image of the two pictures, we have only, as I have already explained, placed the one picture above the other, in so far as the stereoscope is concerned. It is by the subsequent action of the two eyes that we obtain the desired relief. Were we to unite the two pictures when transparent, and take a copy of the combination by the best possible camera, the result would be a blurred picture, in which none of the points or lines of the one would be united with the points or lines of the other; but were we to look at the combintiou with both eyes the blurred picture would start into relief, the eyes uniting in snccessiou the seperate poiuts and lines of which it is composed.

Now, since; in the stereoscope, when looked into with two eyes, we see the pictnre in relief with the same accuracy as, in ordinary binoculocular vision, we see the same object in relief by uniting on the retina two pictures exactly the same as the binocular ones, the mere statement of this fact has been regarded as the theory of the stereoscope. We shall see, however, that it is not, and that it remains to be explained, more minutely than we have done in Chapter III., both how we see objects in relief in ordinary binocular vision, and how we see them in the same relief by uniting ocularly, or in the stereoscope, two dissimilar images of them.

Before proceeding, however, to this subject, we must explain the manner in which half and a quarter lenses unite the two dissimilar pictures.

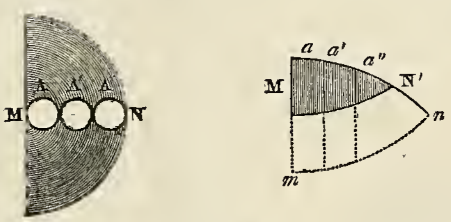

Fig. 17.

In Fig. 17 is shewn a semi-lens M N, with its section M' N'. If we look at any object snccessively throngh the portions A A' A'' in the semi-lens M N corresponding to *a a' a''* in the section M' N', which is the same as in a quarter-lens, the object will be magnified eqnally in all of them, but it will be more displaced, or more refracted, towards N, by looking through A' or *a'* than throngh A or *a*, and most of all by looking through A'' or *a''*, the refraction being greatest at A'' or *a''*, less at A' or *a'*, and still less at A or *a*. By means of a semi-lens, or a quarter of a lens of the size of M N, we can, with an aperture of the size of A, obtain three different degrees of displacement or refraction, without any change of the magnifying power.

If we use the the thicker lens, as shewn at M' N' *n m*, keeping the cnrvatnre of the surface the same, we increase the refracting angle at its margin N' *n*, we can prodnce any degree of displacement we require, either for the purposes of experiment, or for the duplication of large binocular pictures.

When the two half or qnarter lenses are nsed as a stereoscope, the displacement of the two pictures is produced in the manner shewn in Fig. 18, where L L is the lens for the left eye E, and L' L' that for the right eye E', placed so that the middle points, *n o*, *n' o'*, of each are $2\frac{1}{2}$ inches distant, like the two eyes. The two binocular pictures which are to be united are shewn at *a b*, A B, and placed at nearly the same distance. The pictures being fixed in the focus of the lenses, the pencils *a n o*, A' *n' o'*, *b n o*, B' *n' o'*, will be refracted at the points *n, o, n' o'*, and at their points of incidence on the second snrface, so as to enter the eyes, E, E', in parallel directions, thongh not shewn in the Figure. The points *a*, A, of one of the pictnres, will therefore be seen distinctly in the direction of the refracted ray—that is, the pencils *a n*, *a o*, issning from *a'*, will be seen as if they came from *a'*, and the pencils *b n*, *b o*, as if they came from *b'*, so that *a b* will be transferred by refraction to *a' b'*. In like manner, the picture A B will be transferred by refraction to A' B', and thus united with *a' b'*.

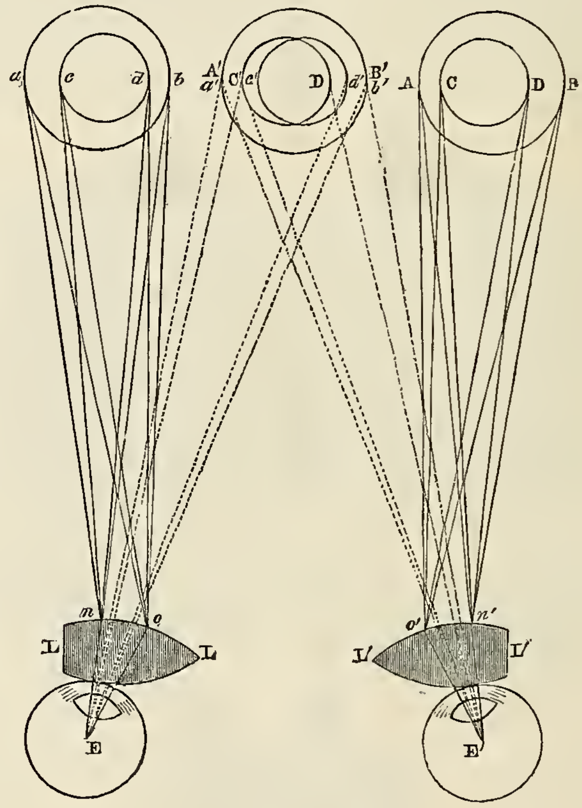

Fig. 18.

The pictures *a b*, A B thus united are merely circles, and will therefore be seen as a single circle at A' B'. But if we suppose *ab* to be the base of the frnstum of a cone, and *c d* its summit, as seen by the left eye, and the circles A B, C D to represent the base and summit of the same solid as seen by the right eye, then it is obvious that when the pictures of *c d* and C D are similarly displaced or refracted by the lenses L L L' L', so that *c c'* is equal to *a* A' and D D' to B B', the circles will not be united, but will overlap one another as at C' D', *c' d'*, in consequence of being carried *beyond* their place of union. The eyes, however, will instantly unite them into one by converging their axes to a remoter point, and the united circles will rise from the paper, or from the base A' B', and place the single circle at the point of convergence, as the summit of the frustum of a hollow cone whose base is A' B'. If *c d*, C D had been *farther* from one another than

a b, as in Figs. 20 and 21, they would still have overlapped thongh not carried np to their place of union. The eyes, however, will instantly unite them by converging their axes to a *nearer* point, and the united circles will rise from the paper, or from the bass A B, and form the summit of the frustum of a *raised* cone whose base is A' B'.

In the preceding illustration we have supposed the solid to consist only of a base and snmmit, or of parts at *two* different distances from the eye; but what is trne of two distances is trne of any number, and the instant that the two pictures are combined by the lenses they will exhibit in relief the body which they represent. If the pictnres are refracted too little, or if they are refracted too much, so as not to be united their tendency to unite is so great, that they are soon brought together by the increased or diminished convergeucy of the optic axes, and the stereoscopic effect is produced. Whenever two pictnres are seen, no relief is visible; when only one picture is distinctly seen, the relief must be complete.

In the preceding diagram we have not shewn the refraction at the second surface of the lenses, nor the parallelism of the rays when they enter the eye,—facts well known in elementary optics.

CHAPTER V.

ON THE THEORY OF STEREOSCOPIC VISION.

Having, in the preceding chapter, described the ocnlar, the reflecting, and the lenticnlar stereoscopes, and explained the manner in which the two binocular pictnres are combined or laid upon one another in the last of these instrnments, we shall now proceed to consider the theory of stereoscopic vision.

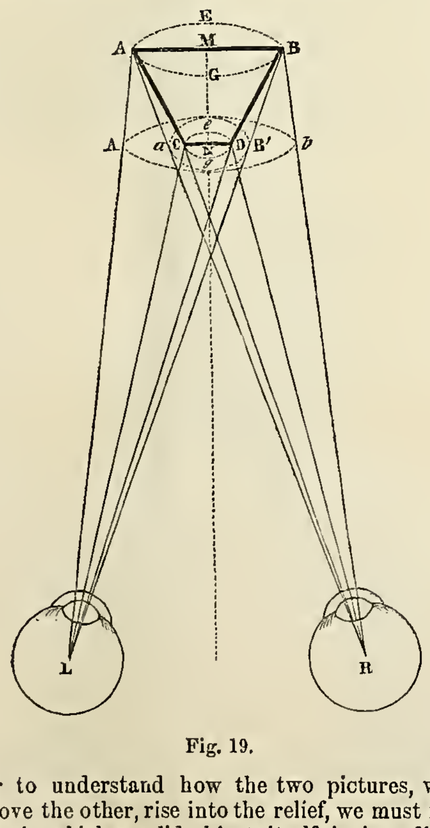

Fig. 19.

In order to understand how the two pictures, when placed the one above the other, rise into the relief, we must first explain the mauner in which a solid object itself, is, in ordinary vision, seen in relief, and we shall then show how this process takes place in the two forms of the ocular stereoscope, and in the lenticular stereoscope. For this pnrpose, let A B C D, Fig. 19, be a section of the frnstum of a cone, that is a cone with its top cut off by a plane C e D g, and having A E B G for its base. In order that the figure may not be complicated, it will be sufficient to consider how we see, with two eyes, L and R, the cone as projected upon a plane passing through its summit C e D g. The points L, R being the points of sight, draw the lines R A, R B, which will cut the plane on which the projection is to be made in the points *a*, *b*, so that *a b* will represent the line A B, and circle, whose diameter is *a b*, will represent the base of the cone, as seen by the right eye R. In like manner, by drawing L A, L B, we shall find that A' B' will represent the line A B, and a circle, whose diameter is A' B', the base A E B G, as seen by the left eye. The summit, C e D g, of the frustum being in the plane of projection, will be represented by the circle C e D g. The representation of the frustum A B C D, therefore, upon a plane surface, as seen by the left eye L, consists of two circles, whose diameters are A B, C D; and, as seen by the right eye, of other two circles, whose diameters are *ab*, CD, which, in Fig. 20, are represented by AB,

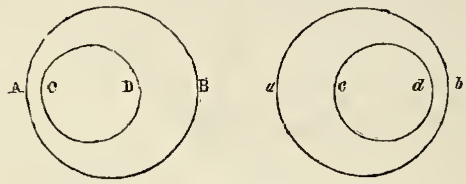

Fig. 20.

CD, and *ab*, *cd*. These plane figures being also the representation of the solid on the retina of the two eyes, how comes it that we see the solid and not the plane pictures? When we look at the point B, Fig. 19, with both eyes, we converge upon it the optic axes L B, R B, and we therefore see the point single, and at the distances, L B, R B from each eye. When we look at the point D, we withdraw the optic axes from B, and converge them npon D. We therefore see the point D single, and at the distances L D, R D from each eye; and in like manner the eyes run over the whole solid, seeing every point single and distinct upon which they converge their optic axcs, and at the distance of the point of convergence from the observer. During this rapid survey of the object, the whole of it is seen distinctly as a solid, although every point of it is seen double and indistinct, excepting the point upon which the axes for the instant converged.

From these observations it is obvious, that when we look with both eyes at any solid or body in relief, *we see more of the right side of it by the right eye, and more of the left side of it by the left eye.* The right side of the frustum A B C D Fig. 19, is represented by the line D*b*, as seen by the right eye, and by the shorter line D B', as seen by the left eye. In like manner, the left side A C is represented by C A', as secn by the left eye, and by the shorter line C*a*', as seen by the right eye.

When the body is hollow, like a wine glass, *we see more of the right side with the left eye, and more of the left side with the right eye.*

If we now seperate, as in Fig. 20, the two projections shewn together on Fig. 19, we shall see that the two summits, C D, *c d*, of the frustum are farther from one another than the more distant bases, A B, *ba*, and it is true generally that *in the two pictures of any solid in relief, the similar parts that are near the observer are more distant in the two pictures than the remoter parts, when the plane of perspective is beyond the object.* In the binocular picture of the human face the distance between the two noses is greater than the distance between the two right or left eyes, and the ditance between the two right or left eyes greater than the distance between the two remoter ears.

We are now in a condition to explain the process by which with the eyes alone, we can see a solid in relief by uniting the right and left eye pictures of it,—or the theory ocular stereoscope. In order to obtain the proper relief we must placc the right eye picture on the left side, and the left eye picture on the right side, as shewn in Fig. 21, by the pictures A B C D, *a b c d*, of the frustum of a cone, as obtained from Fig. 19.

In order to unite these two dissimilar projections, we must converge the optical axes to a point nearer the observer, or look at some point about M. Both pictures will immediately be doub-

led. An image of the figure *ab* will advance towards P, an image of A B will likewise advance towards P; and the instant these images are united, the frustum of a cone, which they represent, will appear in relief at M N, the place where the optic axes meet or cross each other. At first the solid figure will appear in the middle, between the two pictures from which it is formed and of the same size, but after some practice it will appear smaller and nearer the eye. Its smallness is an optical illusion, as it has the same angle of apparant magnitude as the plane figures, namely, *m n* L=A B L; but its position at M N is a reality, for if we look at the point of our finger held beyond M the solid figure will be seen nearer the eye. The difficulty which we experience in seeing it of the size and in the position shewn in Fig. 21, arises from its being seen along with its two plane representations, as we shall prove experimentally when we treat in a future chapter of the union of similar figures by the eye.

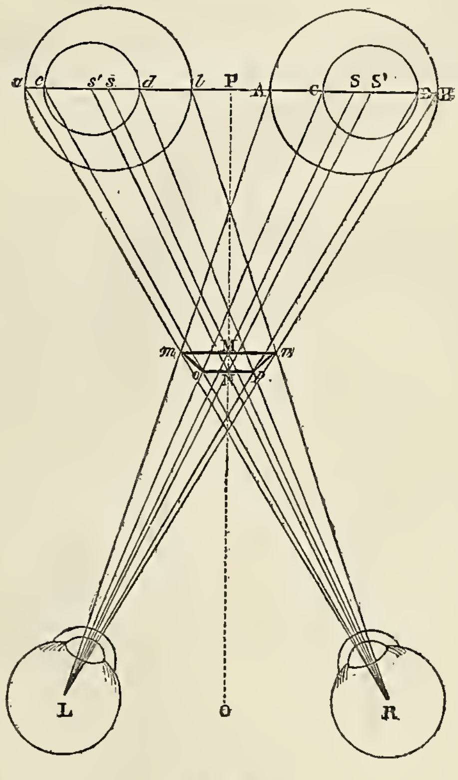

Fig. 21.

The two images being thus superimposed, or united, we shall now see that the combined images are seen in relief in the very same way that in ordinary vision we saw the real solid, A B C D, Fig. 19, in relief, by the union of the two pictures of it on the retina. From the points A, B, C, D, *a*, *b*, *c*, *d*, draw lines to L and R, the centres of visible direction of each eye, and it will be seen that the circles A B, *a b*, representing the base of the cone, can be united by converging the optical axes to points in the line *m n*, and that the circles C D, *c d*, which are more distant, can be united only by converging the optic axes to points in the line *o p*. The points A, *a*, for example, united by converging the axes to *m*, are seen at that point single; the points B, *b* at *n* single, the points C, *c* at *o* single, the points D, *d* at *p* single, the centres S, *s* of the base at M single, and the centres S', *s'* of the summit plane at N single. Hence the eyes L and R see the combined pictures at M N in relief, exactly in the same manner as they saw in relief the original solid M N in Fig. 19.

In order to find the height M N of the conical frustrum thus seen, let D=distance O P; *d*=S *s*, the distance of the two points united at M; *d'*=S' *s'*, the distance of the two points united at N; and C=LR=$2\frac{1}{2}$ inches, the distance of the eyes. Then we have—

$$MP = \frac{Dd}{c+d}$$

$$NP = \frac{Dd'}{c+d'}, \text{ and}$$

$$MN = \frac{Dd}{c+d} - \frac{Dd'}{c+d'}.$$

If D—9·24 inches,
C=2·50, then
d=2·14,
d'=2·42, and
M N=0·283, the height of the cone.

When $c=d$, $MP = \dfrac{DC}{2C}$

As the summit plane *o p* rises above the base *m n* by the successive convergency of the optic axes to different points in the line *o* N *p*, it may be asked how it happens that the conical frustrum still appears a solid, and the plane *o p* where it is, when the optic axes are converged to points in the line *m* M *n*, so as to see the base distinctly? The reason of this is that the rays emanate from *o p* exactly in the same manner, and form exactly the same image of it, on the two retinas as if it were the summit C D, Fig. 19, of the real solid when seen with both eyes. The only effect of the advance of the point of convergence from N to M is to throw the image of N a little to the *right* side of the optic axis of the left eye, and a little to the *left* of the optic axis of the right eye. The summit plane *o p* will therefore retain its place, and will be seen slightly doubled and indistinct till the point of convergence again returns to it.

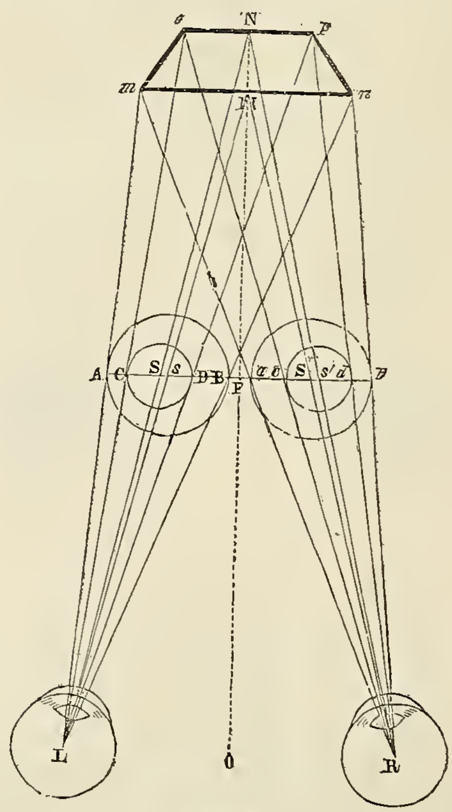

Fig. 22.

It has been already stated that the two dissimilar pictures may be united by converging the optical axes to a point beyond them. In order to do this, the distance S S' of the pictures, Fig. 21, must be greatly less than the distance of the eyes L, R, in order that the optic axes, in passing through similar points of

the two plane pictures, may meet at a moderate distance beyond them. In order to explain how the relief is produced in this case, let A B, C D, *a b*, *c d*, Fig. 22, be the dissimilar pictures of the frustrum of a cone whose summit is C D, as seen by the right eye, and *c d* as seen by the left eye. From L and R, as before, draw lines through all the leading points of the pictures, and we shall have the points A, *a* united at *m*, the points B, *b* at *n*, the points C, *c* at *o*, and the points D, *d* at *p*, the points S, *s* at M, and the point S′, *s*′ at N, forming the cone *m n o p*, with its base *m n* towards the observer, and its summit *o p* more remote. If the cone had been formed of lines drawn from the outline of the summit to the outline of the base, it would now appear *hollow*, the inside of it being seen in the place of the outside as before. If the pictures A B, *ab* are made to change places the combined picture would be in relief, while in the case shewn in Fig. 21 it would have been hollow. Hence the *right*-eye view of any solid must be placed on the *left* hand, and the *left*-eye view of it on the *right* hand, when we wish to obtain it in relief by converging the optic axes to a point between the pictures and the eye, and *vice versa* when we wish to obtain in it relief by converging the optic axes to a point beyond the pictures. In every case when we wish the combined pictures to represent a *hollow*, or the converse of relief, their places must be exchanged.

In order to find the height M N, or rather the depth of the cone in Fig. 22, let D, *d*, C, *c*, represent the same quantities as before, and we shall have

$$\text{MP} = \frac{\text{D}\,d}{\text{C}-d}$$

$$\text{NP} = \frac{\text{D}\,d'}{\text{C}-d'}, \text{ and}$$

$$\text{OP} = \frac{\text{D}\,d'}{\text{C}-d'} - \frac{\text{D}\,d}{\text{C}-d}$$

When D, C, *d*, *d*′ have the same values as before, we shall have MN $=18{\cdot}7$ feet!

When C $= d$, M R will be infinite.

We have already explained how the two binocular pictures

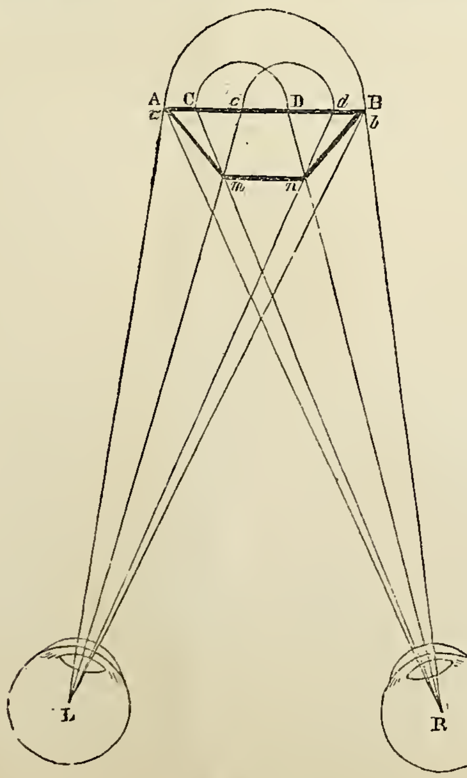

Fig. 23.

are combined or laid upon one another in the lenticular stereoscope. Let us now see how the relief is obtained. The two plane pictures *a b c d*, A B C D, in Fig. 18, are, as we have already explained, combined or simply laid upon one another by the lenses L L, L′ L′ and in this state are shewn by the middle circles at A *a* B *b*, C *c* D *d*. The images of the bases A B, *ab*, of the cone are accurately united in the double base A B, *ab*, but the summits of the conical frustum remain seperate, as seen at C′ D′, *c′ d′*. It is now the business of the eyes to unite these, or rather to make them appear as united. We have already seen how they are brought into relief when the summits are refracted so as to pass one another, as in Fig. 18. Let us therefore take the case shewn in Fig. 20, where the summits C D, *c d* are more distant than the bases A B, *ab*. The union of these is instantly effected, as shewn in Fig. 23, by converging the optic axes to points *m* and *n* successively, and thus uniting C and *c* and D and *d*, and making these points of the summit plane appear at *m* and *n*, the points of convergence of the optic axes L *m*, R *m*, and L *n*, R *n*. In like manner, every pair of points in the summit plane, and in the sides A *m*, B *n* of the frustum, are converged to points corresponding to their distance from the base A B of the original solid frustum, from which the plane pictures A B C D, *a b cd*, were taken. We shall, therefore, see in relief the frustum of a cone whose section is A *m n* B.

The theory of the stereoscope may be expressed and illustrated in the following manner, without any reference to binocular vision:—

1. When a drawing of any object or series of objects is executed on a plane surface from *one point of sight*, according to the principles of geometrical perspective, every point of its surface that is visible from the point of sight will also be represented on the plane.

2. If another drawing of the same object or series of objects is similarly executed on the same plane from *a second* point of sight, sufficient distant from the first to make the two drawings separate without overlapping, every point of its surface visible from this second point of sight will also be represented on the plane, so that we shall have two different drawings of the object placed, at a short distance from each other, on the same plane.

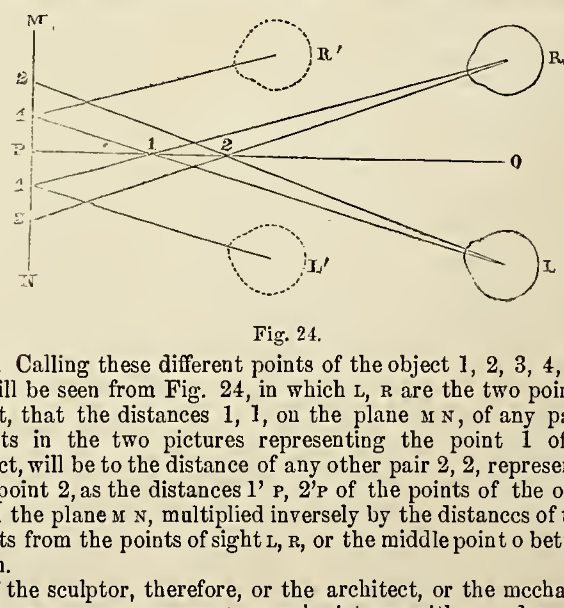

Fig. 24.

3. Calling these different points of the object 1, 2, 3, 4, &c., it will be seen from Fig. 24, in which L, R are the two points of sight, that the distances 1, 1, on the plane M N, of any pair of points in the two pictures representing the point 1 of the object, will be to the distance of any other pair 2, 2, representing the point 2, as the distances 1′ P, 2′P of the points of the object from the plane M N, multiplied inversely by the distances of these points from the points of sight L, R, or the middle point O between them.

If the sculptor, therefore, or the architect, or the mechanist, or the surveyor, possesses two such pictures, either as drawn by measuring the distances of every pair of points, obtain the relief or prominence of the original point, or its distance from the plane M N or A B; and without the use of the stereoscope, the sculptor may model the object from its plane picture, and the distances of every point from a given plane. In like manner, the other artists may determine distances in buildings, in machinery, and in the field.

5. If the distance of the points of sight is equal to the distance of the eyes L, R, the two plane pictures may be united and raised into relief by the stereoscope, and thus give the sculptor and

other artists an accurate model, from which they will derive additional aid in the execution of their work.

6. In the stereoscopic vision, therefore, when we join the points, 1 1 by converging the optic axes to 1′ in the line P O, and the points 2, 2 by converging them to 2′ in the same line, we place these points at the distances O 1, O 2, and *see the relief*, or the various differences of distance which the sculptor and others obtained by the method which we have described.

7. Hence we infer, that if the stereoscopic vision of relief had never been thought of, the principles of the instrument are involved in the geometrical relief which is embodied in the two pictures of an object taken from two points of sight, and in the prominence of every part of it obtained geometrically.

CHAPTER VI.

ON THE UNION OF SIMILAR PICTURES IN BINOCULAR VISION.

In uniting by the convergency of the optic axes two dissimilar pictures, as shown in Fig. 18, the solid cone M N ought to appear at M N much nearer the observer than the pictures which compose it. I found, however, that it never took its right position in absolute space, the base M N of the solid seeming to rest on the same plane with its constituent pictures A B, *a b*, whether it was seen by converging the axes as in Fig. 18 or in Fig. 22. Upon inquiring into the reason of this I found that the disturbing cause was simply the simultaneous perception of other objects in the same field of view whose distance was known to the observer.

In order to avoid all such influences I made experiments on large surfaces covered with similar plane figures, such as flowers or geometrical patterns upon paper-hangings and carpets. These figures being always at equal distances from each other, and almost perfectly equal and similar, the coalescence of any pair of them, effected by directing the optic axes to a point between the paper-hanging and the eye, is accompanied by the instantaneous coalescence of them all. If we, therefore, look at a papered wall without pictures, or doors, or windows, or even at a considerable portion of a wall, at the distance of three feet, and unite two of the figures,—two flowers, for example, at the distance of twelve inches from each other horizontally, the whole wall or visible portion of it will appear covered with flowers as before, but as each flower is now composed of two flowers united at the point of convergence of the optic axes, *the whole papered wall with all its flowers will be seen suspended in the air at the distance of six inches from the observer!* At first the observer does not decide upon the distance of the suspended wall from himself. It generally advances slowly to its new position, and when it has taken its place it has a very singular character. The surface of it seems slightly curved. It has a silvery transparent aspect. It is more beautiful than the real paper, which is no longer seen, and it moves with the slightest motion of the head. If the observer, who is now three feet from the wall, retires from it, the suspended wall of flowers will follow him, moving farther and farther from the real wall, and also, but very slightly, farther and farther from the observer. When he stands still, he may stretch out his hand and place it on the other side of the suspended wall, and even hold a candle on the other side of it to satisfy himself that the ghost of the wall stands between the candle and himself.

In looking attentively at this strange picture some of the flowers have the aspect of real flowers. In some the stalk retires from the plane of the picture. In others it rises from it. One leaf will come farther out than another. One colored portion, *red*, for example, will be more prominent than the *blue*, and the flower will thus appear thicker and more solid, like a real flower compressed, and deviating considerably from the plane representation of it as seen by one eye. All this arises from slight and accidental differences of distance in similar or corresponding parts of the united figures. If the distance, for example, between two corresponding leaves, is greater than the distance between other two corresponding leaves, then the two first when united will appear nearer the eye than the other two, and hence the appearance of a flower in low relief, is given to the combination.

In continuing our survey of the suspended image another curious phenomenon often presents itself. A part of one, or even two pieces of paper, and generally the whole length of them from the roof to the floor, will retire behind the general plane of the image, as if there were a recess in the wall, or rise above it as if there were a projection, thus displaying on a large scale the imperfection in the workmanship which otherwise it would have been difficult to discover. This phenomenon, or defect in the work, arises from the paper-hanger having cut off too much of the margin of one or more of the adjacent strips or pieces, or leaving too much of it, so that, in the first case, when the two halves of a flower are joined together, part of the middle of the flower is left out, and hence, when this defective flower is united binocularly with the one on the right hand of it, and the one on the left hand united with the defective one, the united or corresponding portion being at a less distance, will appear farther from the eye than those parts of the suspended image which are composed of complete flowers. The opposite effect will be produced when the two portions of the flowers are not brought together, but separated by a small space. All these phenomena may be seen, though not so conveniently, with a carpet from which the furniture has been removed. We have, therefore, an accurate method of discovering defects in the workmanship of paper-hangings, carpet-makers, painters, and all artists whose profession it is to combine a series of similar patterns or figures to form an uniformly ornamented surface. The smallest defect in the similarity or equality of the figures or lines which compose a pattern, and any difference in the distance of single figures is instantly detected, and what is very remarkable a small inequality of distance in a line perpendicular to the axis of vision, or in one dimension of space, is exhibited in a magnified form at a distance coincident with the axis of vision, and in an opposite dimension of space.

A little practice will enable the observer to realize and maintain the singular binocular vision which replaces the real picture.* The occasional retention of the picture after one eye is closed, and even after both have been closed and quickly re-opened, shows the influence of time over the evanescence as well as over the creation of this class of phenomena. On some occasions, a singular effect is produced. When the flowers or figures on the paper are distant *six* inches, we may either unite *two* six inches distant, or *two* twelve inches distant, and so on. In the latter case, when the eyes have been accustomed to survey the suspended picture, I have found that, after shutting or opening them, I neither saw the picture formed by the two flowers *twelve* inches distant, nor the papered wall itself, but a picture formed by uniting all the flowers *six* inches distant! The binocular centre (the point to which the optic axes converged, and consequently the locality of the picture) had shifted its place, and instead of advancing to the real wall and seeing it, it advanced exactly as much as to unite the nearest flowers, just as in a rachet wheel, when the detent stops one tooth at a time; or, to speak more correctly, the binocular centre advanced in order to relieve the eyes from their strain, and when the eyes were opened, it had just reached that point which corresponded with the union of the flowers *six* inches distant.

We have already seen, as shewn in Fig. 22, that when we fix the binocular centre, that is, converge the optic axes on a point beyond the dissimilar pictures, so as to unite them, they rise into relief as perfectly as when the binocular centre, as shown in Fig. 18, is fixed between the pictures used and the eye. In like manner we may unite similar pictures, but, owing to the opacity of the wall and the floor, we cannot accomplish this with paper-hangings and carpets. The experiment, however, may be made with great effect by looking through transparent patterns cut out of paper or metal, such as those in zinc which are used for larders and other purposes. Particular kinds of trellis-work, and windows with small squares or rhombs of glass, may also be

* A sheet of Queen's heads may be advantageously used to accustom the eyes to the union of similar figures.

used, and, what is still better, a screen might be prepared, by cutting out the small figures from one or more pieces of paper-hangings. The readiest means, however, of making the experiment, is to use the cane bottom of a chair, which often exhibits a succession of octagons with small luminous spaces between them. To do this, place the back of the chair upon a table, the height of the eye either when sitting or standing, so that the cane bottom with its luminous pattern may have a vertical position, as shown in Fig. 25, where M N is the real bottom of the chair with

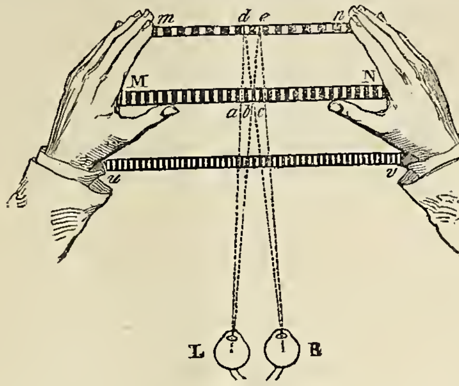

Fig. 25.

its openings, which generally vary from half an inch to three-fourths. Supposing the distance to be half an inch, and the eyes, L, R, of the observer 12 inches distant from M N, let L *a d*, L *b e* be lines drawn through the centres of two of the open spaces *a*, *b*, and R *b d*, R *c e* lines drawn through the centres of *b* and *c*, and meeting L *a d*, L *b e* at *d* and *e*, *d* being the binocular centre to which the optic axes converge when we look at it through *b* and *c*. Now, the right eye, R, sees the opening *b* at *d*, and the left eye sees the opening *a* at *d*, so that the image at *d* of the opening consists of the similar images of *a* and *b* united, and so on with all the rest; so that the observer at L, R no longer sees the real pattern M N, but an image of it suspended at *m n*, three inches behind M N. If the observer now approaches M N, the image *m n* will approach to him, and if he recedes, *m n* will recede also, being $1\frac{1}{2}$ inches behind M N when the observer is *six* inches before it, and *twelve* inches behind M N when the observer is *forty-eigh* inches before it, the image *m n* moving from *m n* with a velocity one-fourth of that with which the observer recedes.

The observer resuming the position in the figure where his eyes, L, R, are *twelve* inches distant from M N, let us consider the important results of his experiment. If he now grasps the cane bottom at M N, his thumbs pressing upon M N, and his fingers trying to grasp *mn* he will then *feel what he does not see*, and *see what he does not feel!* The real pattern is absolutely invisible at M N, where he feels it, and it stands fixed at *m n*. The fingers may be passed through and through between the real and the false image, and beyond it, —now seen on this side of it, now in the middle of it, and now on the other side of it. If we next place the palms of each hand upon M N, the real bottom of the chair, feeling it all over, the result will be the same. No knowledge derived from touch—no measurement of real distance —no actual demonstration from previous or subsequent vision, that there is a real solid body at M N, and nothing at all at *m n* will remove or shake the infallible conviction of the sense of sight that the cane bottom is at *m n*, and that *d* L or *d* R is its real distance from the observer. If the binocular centre be now drawn back to M N, the image *seen* at *m n* will disappear, and the real object be *seen and felt at* M N. If the binocular centre be brought further back to *f*, that is if the optic axes are converged to a point nearer the observer than the object, as illustrated by Fig. 18, the cane bottom M N will again disappear, and will be seen at *u v*, as previously explained.

This method of uniting small similar figures is more easily attained than that of doing it by converging the axes to a point between the eye and the object. It puts a very little strain upon the eyes, as we cannot thus unite fignres the distance of whose centre is equal to or exceeds $2\frac{1}{2}$ inches, as appears from Fig. 22.

In making these experiments, the observer cannot fail to be struck with the remarkable fact, that though the openings M N *m n*, *u v*, have all the same apparaut or angular magnitude, that is, subtend the same angle at the eye, viz. *d* L *c*, *d* R *e*, yet those at *mn* appear larger, and those at *u v* smaller, than those at M N. If we cause the image *m n* to recede and approach to us, the figures in *m n* will invariably *increase as they recede*, and those in *u v* diminish as they approach the eye, and their *visual magnitudes*, as we call them, will depend on the respective distances at which the observer, whether right or wrong in his estimate conceives them to be placed, a result which is finely illustrated by the different size of the moon when seen in the horrizon and in the meridian. The fact now stated is a general one, which the preceding experiments demonstrate; and though our estimate of magnitude thus formed is erroneous, yet it is one which neither reason nor experience is able to correct.

It is a curious circumstance, that, previous to the publication of these experiments, no examples have been recorded of false estimates of the distance of near objects in consequence of the *accidental* binocular union of similar images. In a room where the paper-hangings have a small pattern, a short-sighted person might very readily turn his eyes on the wall when their axes converged to some point between him and the wall, which would unite one pair of the similar images, and in this case he would see the wall nearer him than the real wall, and moving with the motion of his head. In like manner a long-sighted person, with his optical axes converged to a point beyond the wall, might see an image of the wall more distant, and moving with the motion of his head; or a person who has taken too much wine, which often fixes the optical axes in opposition to the will, might, according to the nature of his sight, witness either of the illusions above mentioned.

Illusions of both these kinds, however, have recently occurred. A friend to whom I had occasion to shew the experiments, and who is short-sighted, mentioned to me that he had on two occasions been greatly perplexed by the vision of these suspended images. Having taken too much wine, he saw the wall of a papered room suspended near him in the air; and on another occasion, when kneeling, and resting his arms on a cane-bottomed chair, he had fixed his eyes on the carpet, which had accidentally united the two images of the open octagon, and thrown the image of the chair bottom beyond the plane on which he rested his arms.

After hearing my paper on this subject at the Royal Society of Edinburgh, Professor Christison communicated to me the following interesting case, in which one of the phenomena above described was seen by himself: —"Some years ago," he observes "when I resided in a house where several rooms are papered with rather formally recurring patterns, and one in particular with stars only, I used occassionally to be much plagued with the wall suddenly standing out upon me, and waving, as you describe, with the movements of the head. I was insensible that the cause was an error as to the point of union of the visual axes of the two eyes; but I remember it sometimes cost me a considerable effort to rectify the error; and found that the best way was to increase still more the deviation in the first instance. As this accident occurred most frequently while I was recovering from a severe a attack of fever, I thought my near-sighted eyes were threatened with some new mischief; and this opinion was justified in finding that, after removal to my present house, where, however, the papers have uo very formal pattern, no such occurrence has ever taken place. The reason is now easily understood from your researches."*

Other cases of an analogous kind have been communicated to me; and very recently M. Soret of Geneva, in looking through a trellis-work in metal stretched upon a frame, saw the phenomenon represented in Fig. 25, and has given the same explanation of it which I had published long before.†

* See *Edin Transactions*, 1846, vol. xv. p. 663, and *Phil. Mag.*, May 1847, vol. xxx. p. 305.

† *Bibl Universelle*, October, 1855, p. 136.

Before quitting the subject of the binocular union of *similar* pictures, I must give some account of a series of curious phenomena which I observed by uniting the images of lines meeting at an angular point when the eye is placed at different heights above the plane of the paper, and at different distances from the angular point.

Let A C, B C, Fig. 26, be two lines meeting at C, the plane passing through them being the plane of the paper, and let them be viewed by the eyes successively placed at E‴, E″, E′, and E,

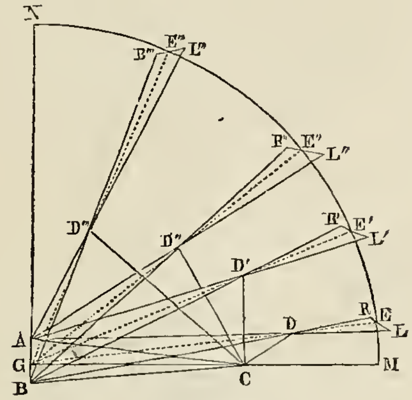

Fig. 26.

at different heights in a plane, G M N, perpendicular to the plane of the paper. Let R be the right eye, and L the left eye, and when at E‴, let them be strained so as to unite the points A, B. The united image of these points will be seen at the binocular centre D‴, and the united lines A C, B C, will have the position D‴ C. In like manner when the eye descends to E″, E′, E, the united image D‴ C will rise and diminish, taking the positions D″ C, D′C, D C, till it disappears on the line CM, when the eyes reach M. If the eye deviates from the vertical plane G M N, the united image will also deviate from it, and is always in a plane passing through the common axis of the two eyes and the line G M.

If at any altitude EM, the eye advances towards A C B in the line EG, the binocular centre D will also advance towards A C B in the line EG, and the image D C will rise, and become shorter as its extremity D moves along DG, and, after passing the perpendicular to GE, it will increase in length. If the eye, on the other hand, recedes from A C B in the line G E, the binocular centre D will also recede, and the image DC will descend to the plane CM, and increase in length.

The preceeding diagram is, for the purpose of illustration, drawn in a sort of perspective, and therefore does not give the true positions and lengths of the united images. This defect, however, is remedied in Fig. 27, where E, E′, E″, E‴ is the mid-

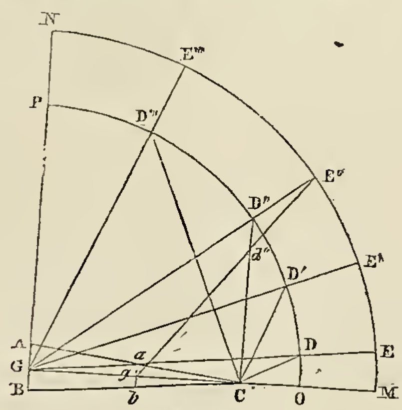

Fig. 27.

dle point between the two eyes, the plane G M N being, as before, perpedicular to the plane passing through A C B, Now, as the distance of the eye from G is supposed to be the same, and as A B is invariable as well as the distance between the eyes, the distance of the binocular centres O, D, D′, D″, D‴, P from G, will also be invariable, and lie in a circle O D P, whose centre is G, and whose radius is GO, the point O being determined by the formula $G\,O = G\,D = \frac{G\,M \times A\,B}{A\,B + R\,L}$. Hence in order to find the binocular centres D, D′, D″, D‴, &c., at any altitude, E, E′, &c., we have only to join EG, E′ G, &c., and the points of intersection D, D′, &c., will be the binocular centres and the lines D C, D′ C, &c., drawn to C, will be the real lengths and inclinations of the united images of the lines A C, B C.

When G O is greater than G C there is obviously some angle A, or E″ G M, at which D″ C is perpendicular to G C.

This takes place when Cos. $A = \frac{G\,C}{G\,O}$. When O coincides with C, the images C D, C D′, &c., will have the same positions and magnitudes as the chords of the altitudes A of the eyes above the plane G C. In this case the raised or united images will just reach the perpendicular when the eye is in the plane G C M, for since G C = G O, Cos. A = 1 and A = 0.

When the eye at any position, E″ for example, sees the points A and B united at D″, it sees also the whole lines A C, B C forming the image D″ C. The binocular centre must, therefore, run rapidly along the line D″C; that is, the inclination of the optic axes must gradually diminish till the binocular centre reaches C, when all strain is removed. The vision of the image D″ C, however, is carried on so rapidly that the binocular centre returns to D″ without the eye being sensible of the removal and resumption of the strain which is required in maintaining a view of the united image D″ C. If we now suppose A B to diminish, the binocular centre will advance towards G, and the length and inclination of the united images D C, D′ C, &c., will diminish also, and *vice versa*. If the distance RL (Fig. 26) between the eyes diminishes, the binocular centre will retire towards E, and the length and inclination of the images will increase. Hence persons with eyes more or less distant will see the united images in different places and of different sizes, though the quantities A and A B be invariable.

While the eyes at E″ are running along the lines A C, B C, let us suppose them to rest upon the points $a\,b$ equidistant from C. Join $a\,b$, and from the point g, where $a\,b$ intersects G C, draw the line g E″, and find the point d'' from the formula $g d'' = \frac{g E'' \times ab}{a\,b + R\,L}$. Hence the two points a, b will be united at d'', and when the angle E″GC is such that the line joining D and C is perpendicular to G C, the line joining d'' C will also be perpendicular to G C, the loci of the points D″ d'', &c., will be in that perpendicular, and the image D C, seen by successive movements of the binocular centre from D″ to C, will be a straight line.

In the preceding observations we have supposed that the binocular centre D″, &c., is between the eye and the lines A C, B C; but the points A, C, and all other points of these lines, may be united by fixing the binocular centre beyond A B. Let the eyes, for example, be at E″; then if we unite A, B when the eyes converge to a point, △″, (not seen in the Figure) beyond G, we shall have $G \triangle'' = \frac{G\,E \times A\,B}{R\,L - A\,B}$; and if we join the point △″ thus found and C, the line △′ C will be the united image of A C and B C, the binocular centre ranging from △″ to C, in order to see it as one line. In like manner, we may find the position and length of the image △‴ C, △′C, and △C, corresponding to the position of the eyes at E‴ and E. Hence all the united images of A C, B C, viz., C △‴, C△″, &c., will lie below the plane of A B C, and extend beyond a vertical line N G continued; and they will grow larger and larger, and approximate in direction to C G as the eyes descend from E‴ to M. When the eyes are near to M, and a little above the plane A B C, the line, when not carefully observed, will have the appearance of coinciding with C G, but stretching a great way beyond G. This extreme case represents the celebrated experiment with the compasses, described by Dr. Smith, and referred to by Professor Wheatstone. He took a pair of compasses, which may be represented by A C B, A B being their points, A C, B C their legs, and C their joint; and having placed his eyes about E, above their plane, he made the following experiment:—"Having opened the points of a pair of compasses

"Industrious little [illegible]"

somewhat wider than the interval of your eyes, with your ar m extended, hold the head or joint in the ball of your hand, with the points outwards, and equidistant from your eyes, and somewhat higher than the joint. Then *fixing your eyes upon any remote object* lying in the plane that bisects the interval of the points, you will first perceive two pair of compasses, (each by being doubled with their inner legs crossing each other, not unlike the old shape of the letter W.) But by compressing the legs with your hand the two inner points will come nearer to each other; and when they unite (having stopped the compression) the two inner legs will also entirely coincide and bisect the angle under the outward ones, and will appear more vivid, thicker, and larger, than they do, so as to reach from your hand to the remotest object in view even in the horizon itself, if the points be exactly coincident."* Owing to his imperfect apprehension of the nature of this phenomenon, Dr. Smith has omitted to notice that the united legs of the compasses lie below the plane of A B C, and that they never can extend further than the binocular centre at which their points A and B are united.

There is another variation of these experiments which possesses some interest, in consequence of its extreme case having been made the basis of a new theory of visible direction, by the late Dr. Wells.† Let us suppose the eyes of the observer to advance from E to N, and to descend along the opposite quadrant on the left hand of NG, but not drawn in Fig. 27, then the united image of A C, B C will gradually descend towards C G, and become larger and larger. When the eyes are a very little above the plane of A B C, and so far to the left hand of A B that C A points nearly to the left eye and C B to the right eye, then we have the circumstances under which Dr. Wells made the following experiment:—"If we hold two thin rules in such a manner that their sharp edges (A C, B C in Fig. 27) shall be in the optic axes, one in each, or rather a little below them, *the two edges will be seen united in the common axis*, (G C in Fig. 27;) and this appaent edge will seem of the same length with that of either of the real edges, when seen alone by the eye in the axes of which it is placed." This experiment, it will be seen, is the same with that of Dr. Smith, with this difference only, that the points of the compasses are directed towards the eyes. Like Dr. Smith Dr. Wells has omitted to notice that the united image rises above G H, and he commits the opposite error of Dr. Smith, in making the length of the united image too short.

If in this form of the experiment we fix the binocular centre beyond C, then the united images of A C, and B C descend below G C, and vary in their length, and in their inclination to G C according to the height of the eye above the the plane of A B C, and its distance forom A B.

(*To be continued*).

THE OXYMEL PROCESS.

To the Editor of the Photographic Journal:

SIR,—Some time has now elapsed since Mr. Llewelyn communicated to your Journal a modification of the honey preservative proccss, but as yet we have not heard how far it has been found to be generally successful. It is in the hope of commencing a discussion, which may elicit some further information, that I am induced to offer the results of my own experience in the use of oxymel.

The material with which I have been working is of my own making; it was prepared from the finest honey and with the correct quantity of acetic acid. By acetic acid, I understand the strong acid of the Pharmacopœia, containing about 30 per cent. real acetic acid, and often sold by the name of Beaufoy's acid.

The principle objections to the process I have found to be its extreme slowness, and the difficulty of getting up the intensity of the negative. On favorable days, and with a quick working view lens, *five minutes* has been the minimum exposure, and with some samples of collodion the sensitiveness appears to be diminished as much as from ten to fifteen times. But after the invisible image has been fully impressed, considerable difficulty occurs in its development. Four or five doses of pyrogallic acid, with nitrate of silver added to each, are required to give the picture sufficient opacity. The reduced silver has a dull leaden appearance, both by reflected and transmitted light, more resembling an image developed by sulphate of iron than a good pyrogallic negative. The translucency does not depend upon an imperfect reduction of silver, for I find by using certain tests, which have been described in my papers on the photographic image, that the quantity of silver is equal to what is commonly found in an intense collodion negative. The mode of deposition must therefore present some peculiarity, and whatever this may be, it is evidently caused by the use of the oxymel, for it occurs with any collodion, and pyrogallic solution of various degrees of strength. Mr. Llewelyn has not met with this difficulty. He has exhibited negatives of a very superior quality, taken on plates preserved by oxymel. The image he obtains lacks the rich creamy appearance which may often be seen on looking down upon a fine negative taken with fresh collodion; but it is quite black when held up to the light. His oxymel was not of home manufacture, and consequently we are uncertain as to its exact composition. Possibly it may not have contained the theoretical quantity of acetic acid? If Mr. Llewelyn could inform us exactly how much acid should be used, and what would be the effect of increasing or diminishing it beyond the proper proportions, it would be a great service. The acetic acid is said to be employed to prevent the honey from becoming mouldy or from fermenting; but might not some essential oil, or a minute quantity of kreosote, be substituted with advantage?

When preserved plates are to be employed within a few hours after their preparation, the original process of Mr. Shadbolt is very certain and simple, according to the experience of many who have tried it. The development is usually rapid, and a *brown* negative, very useful for printing, is often obtained. But if some days are to elapse before the plates are exposed, it would seem more proper to remove the whole, or nearly the whole, of the free nitrate of silver, for by the chemical action of the honey on the nitrate of silver a condition of film is gradually produced, upon which the darker parts of the landscape make no impression. I have invariably found in such a case that the green foliage is best brought out upon films which had been well washed previous to the application of the honey. This also is the experience of Dr. Mansell, who follows a process very similar to that of Mr. Llewelyn, but substituting a concentrated solution of honey for the oxymel. This however, adds to the expense, and as I should imagine, to the difficulty of washing off the syrup from the plates. The convenience too of using a *bath* for the preservative liquor is so great, that such a mode of manipulation recommends itself in preference to the other. The most obvious requirements in the honey process are—moderate sensitiveness (not more than *four times* less than that of the fresh plates), a facility of removing the syrup from the film after exposure, and a tolerable rapid development. The oxymel has not, in my hands, supplied the first and last of these desiderata, but the quality of negative it yields appears to be so good, as far as details and shading are concerned, that I am induced to apply to Mr. Llewelyn for further instructions on the best mode of preparing the preservative liquid in a really efficient state.

I am, Sir,

Yours most obediently,

F. HARDWICH.

NITRATE OF COPPER.—A combination of peroxide of copper and nitric acid. It is easily prepared by digesting four parts of nitric acid diluted with water, upon six parts copper filings, and evaporating the solution until a pellicle forms on the surface. It is very deliquescent, and must therefore be kept in a tightly ground stoppered bottle. May be used as a quickening agent in the production of glass or paper photographs, but is not of sufficient practical utility to make it of importance.

* Smith's *Opticks*, vol. ii. p. 388, §977.

† *Essay on Single Vision, &c., p.* 44.

From the London Art Journal.

SUGGESTIONS OF SUBJECT TO THE STUDNET IN ART.*

BY AN OLD TRAVELLER.

CHAPTER VIII.

Predilections of the Early Painters—Subjects from Scripture—From the Legends of the Saints—Practice of our own time capable of Amelioration—Rome and her Visitors—The Museo Chiaramonti—The Nuovo Braccio—Statue of Demosthenes—The Sculptor and his Subject—The Stranger on the Hearth—Adrastus the Suppliant—The Lustral Rites are granted—Adrastus at the Chase—Death of Atys—Immolation of the Homicide—Men of Corinth at Petra—The Mother in the Portico—Hesitation of the Envoys—Labda listening—Escape of Cypselus—Fulfilment of the Oracle—Tasso—Idraote and Armida—The Enchantress in the Camp—Instructions—Godfrey before Jerusalem—Clorinda—The Leader wounded—Ariosto—Orlando and the Dead Palfrey—The Paladin and the Peasant—Frithiof—Farewell of the Fathers—Words of Wisdom—Frithiof and Ingebore—Childhood—Youth — The Ocean bark—The Torrent—Demand of the Bride—Lovers at the Shrine of Baldar.

The earlier schools of painting are reproached with too exclusive an attachment to one class of subjects—those derived from Holy Writ and from the Legends of the Saints, that is to say : nor is the charge without foundation. But, to say nothing, at the present time, of all the many reasons that might be assigned to explain, if not entirely to justify, their choice, might we not more profitably turn our attention to the question, whether we do not ourselves too rarely lift our thoughts to the grand inspiring themes presented by those inexhaustible treasuries, more especially by the first-named ? For how largely extended are the vistas opening to the sons of Art with every page they turn in the long period of the Hebrew history; and how numerous are the yet more touching episodes offering themselves to their holiest aspirations in the later annals of the New Testament!

Not to every man is it given to tread this high and hallowed ground, you will say, and you are right—the most exalted among you may well feel awe-struck, and pause long before he approach the solemn subjects in question; but for him, the true artist—and to none of inferior character could they be fittingly named—the hour does come when all things are permitted to his research. There are moments when the grandest reveal the most awful of their mysteries to his perception—when the holiest are too sacred for his reverential gaze. For him it is that the pencil of immortals has been imbued with those hues of heaven, vouchsafed to such as he is, in their purest dreams. Let him accept in all humility the high privilege thus conferred upon him ; let him seize the moment, ere the glory of the vision shall become too resplendent for his mortal eyes, and so be lost for the multitudes less favored, who might else rejoice therein through all coming ages.

We do not now name any special instance of the treasures reserved for the most favored son of Art in these, the first and richest of his sources; although more than one great task—destined for the noblest only—rise with impressive majesty before us. These are subjects that should be self-inspired—taken as they present themselves, at the rightful moment : they will then emanate, as should be, from the mind awakened to their momentous importance—from the heart enlarged for their reception: firmly shall the priest-like artist then fix his gaze, with power to meet, undazzled, the light ever beaming from those lofty regions wherein his chastened imagination shall then have unfolded all the force of her pinions. Thus alone can they be worthily treated; but let him to whom the moment shall be vouchsafed, see that he suffer it not to pass infructuous—let him " work while it is called to-day, for the night cometh wherein no man can work."

Much has been said, and much written, of the various emotions experienced by such as stand for the first time before the gates of Rome—much and truly; since there are few events, among those of secondary importance in the life of man, better calculated to make a profound impression, than is the first arrival of the traveller in Rome. Yet, with a more effective eloquence, might that speaker expatiate, who should describe the feelings agitating the heart of him who returns for the second, third—nay, tenth or twentieth time, to that true centre of affection for all whose love is given to Art in its highest manifestations.

But, like other feelings deeply seated, these are less frequently insisted on, nor will any attempt to describe them be made here: confining ourselves within narrower limits, we will but ask the *frequent* sojourner in the beloved city, if—even at this broad distance, though seas are rolling and half a world is interposing its diminishing influence between him and the seven hills—his heart do not even now leap in his bosom, as he recalls the passionate eagerness wherewith he hastens to revisit the more immediate objects of his predilection—once those gates are past?

Is not that moment, when these—whatever, among Rome's myriad treasures, may be the chosen—once more stand, revealing their beauties to his gladdened gaze—one long to be remembered, and ever recurred to with new delight? Happy they whose lives can reckon many such! still happier those to whom fair Hope gives promise of yet many to come in the future!—you, who read these words, are for the most part in the last-named category. So much the better; and in your case may the bright-eyed syren prove even fairer than her promise, although to do so be not always her wont.

In that part of the galleries of the Vatican known as the Museo Chiaramonti, in the hall usually called the Nuovo Braccio, and standing on the right of him whose blessed hap it is to pass his hours in that glorious treasure-house; on his right, I say, as he descends the gallery from its entrance in the great corridor of Bramante,† is the one object ever devoutly sought and reverently approached with the first salutations of return, by the present writer—even before the Apollo—nay, even before the Laocoon, which last obtains the second visit. This is a statue of Demosthenes, somewhat larger than life, and obviously produced in the best period of Art's development. With the exception of the hands, and the scroll held by the orator in his right hand, no part of the work has suffered restoration—all beside is of the purest Greek workmanship. The attitude of the figure is noble and dignified; the face is full of thought; the expression is calm and grave; the draperies are simple and graceful; and over the whole is breathed a spirit of repose, investing the presence of this majestic form with a power forbidding the approach of every trivial thought: nay, suffering none save the best and purest feelings to have birth within the space made sacred by that bequest of beauty, wherewith the grand and solemn past hath enriched all future time.

And how gladly would the beholder resign himself to those salutary influences, undisturbed by recollection of the frailties that marred the life of the original! how fain would one believe the statesman and orator as noble in his life as the sculptor has rendered him in his looks! but this may not be. To Art alone do we give all our worship here; for the subject, we have only the wish that we could forget the cowardice marring the soldier; the yet baser corruption that disgraced the statesman. We cannot fail to glorify the fine conception, so happily executed, of the certainly exalted Sculptor—whose name we have not been able to make certain, among the conflicting testimony assigning it to the few that could be supposed capable of its production—but for Demosthenes himself, apart from his power as an orator, to which we can offer nothing better than admiration, the memory supplies few recollections of his career that are not shaded by regrets.‡

The statue was discovered in excavations made near the Villa Aldobrandini, at Frascati, and was immediately secured for the

* Continued from p. 283.

† So called, as the reader will at once perceive, from that excellent master by whom the magnificent gallery thus named was constructed ; and to whom is indeed due very much of the credit, more commonly attributed to Michael Angelo, for other parts of the Vatican and St. Peter's.

‡ See Becker, "*Demosthenes als Staatsmann und Redner.*" Halle, 1816 and 1830.

sovereign pontiff, then Gregory XVI., who placed it where it now stands. It will one day be removed, without doubt, into some fane, set apart for special objects, as are those well-remembered "Gabinetti," assigned to the Antinous, the Laocoon, the Apollo, and some few others, all dearly familiar to the artist, whose best-loved haunt is the matchless sculpture galleries of the Vatican.

It was while ourselves privileged to listen to the discussion of some few among the lovers of Art who have most worthily paced those halls of beauty and greatness, that we were made acquainted with designs, never carried beyond the first thought, although well meriting a more extended existence And who shall say that they may not yet secure such from some young aspirant of the coming times? Let us, at least, lay the subjects before him; and if the student in sculpture or painting shall find any one among them awaken a congenial chord in his bosom, he may, perchance, be tempted to look further into their sources.*

You have first a youth, or one who has but just attained to manhood, for the authorities do not tell us his exact age; he is seated amidst the ashes of the hearth in a Lydian dwelling.† Covered almost entirely by the robe, wherein, complying with the custom imposed upon all in his condition, he has carefully involved his person, you do but see the profile of his face, yet this, no less than his attitude, gives evidence of profound grief and humiliation. The expression is not that of guilt, still less is there any touch of baseness in the aspect, which is indeed both noble and beautiful. The eyes of the mourner are bent on the ground; and beside him, fixed firmly into the earth, is the weapon wherewith it hath been his unhappy chance to commit the homicide which compels him thus to seek protection and aid from one powerful enough to shield, and of condition conferring the ability to absolve him from the consequences of his involuntary crime. To that end then is the stranger now seated on the hearth of Crœsus; and it is the King of Lydia, a man of ripe age and imposing figure, whom you see looking gravely on the suppliant, imploring refuge and the rites of expiation at his hands.

And the looks of Crœsus show us that these will not be refused. In reply to the king's inquiry, the afflicted youth has said—

"I am the son of Gordius, and grandson of Minos. My name is Adrastus; unwittingly have I slain my brother. Driven to exile by my father, and reft of all, I come here thy suppliant, O king!"

And the king replies—

"You are the child of my friends, and you are come to your friends; abide in my house, where you shall know no want, and bear this calamity as meekly as you may."

The lustral waters are prepared accordingly, with all beside demanded by the ceremonies of expiation;‡ the Furies receive their propitiatory offerings; and these rites accomplished, invocations are duly made to Jove the Expiator, when Adrastus takes up his residence in the palace of the king.

In our second subject we again have the manly and graceful figure of Adrastus, but he is now engaged with Atys, the beloved son of the Lydian king, in chase of a monstrous boar.—Ah! Vellati, how wouldst thou depict him for us, and how would thy Rome, the beloved, rejoice in the work!—a boar that has ravaged the country, and for the destruction whereof Crœsus has reluctantly, and in dread of menacing omens, permitted his son to go forth; but not until he has solemnly confided him to the guardianship of Adrastus, who accepts the charge with upright mind, well resolved to fulfil it at risk of his life.

But who shall alter the decrees of the gods?—the powerful boar-spear, held in watchful readiness for the defence of his companion, has been poised in his vigorous hand, still raised for the act, the weapon has gone, making its own wild music through the air, and now stands quivering in the side, alas! not of the boar, but of that other beautiful youth, the treasured son of his benefactor, the doomed Atys, whom you see falling to earth, and who must die beneath the stroke. Woe! woe! for the unhappy Adrastus; see the sorrow to death that is already gnawing at his heart! He has fulfilled the oracle which had foretold this fate for his son Atys to Crœsus, who had vainly striven to avert the misfortune by withholding the youth from arms and the chase, until, yielding to his entreaty, he had permitted him to come forth on this fatal morn—and for this! Woe! deep, irremediable woe for Adrastus! Nor will he further seek to struggle with the destiny that oppresses him—pass some few short, fleeting hours, and he too will join the shades below. Self-immolated, he shall fall on the tomb of Atys, and the god, before implacable, shall at length be appeased.

From the same peculiar series of histories, but widely different character, here follows another of the subjects in question.

Standing beneath the vestibule of a house at Petra, not far removed from the radiant and luxurious, yet withal refined and learned city of Corinth, whose domes may be discerned in the distance, is a company of ten men, to whom and from the house there has advanced a woman: she is not remarkable for beauty, nor in her first youth, but is invested with the interest ever accorded to the character of a mother, and such is the relation she bears to the fair infant whom you see her placing in the arms of the man standing foremost of that company. You cannot doubt this, as you mark the looks of tender love and pride that light up her face as she resigns her treasure to his hands. The woman is Labda, a daughter of the Bacchiadæ, "but being halt from birth, no man of her own people would take her to wife;" wherefore her father, Amphion, has bestowed her on the son of Echaras, even Ætion, and to him she has borne the son but now confided to the arms of the stranger,

But of this infant the oracle has said:—

"He shall be a lion on your path, O Corinthians! Strong, a devourer of flesh, his power shall relax the joints of many. On these things brood well, ye who dwell around fair Pirene and in frowning Corinth—an eagle in the rocks shall bring him from afar to be your bane."

These men are the envoys of Corinth, sent hither to destroy the son of Ætion, and resolving that he who first receives the child shall dash him on the rocks beside the dwelling. But the boy smiles brightly in the face of his intended murderer, and the latter, rendered incapable of his dark design by that sweet aspect, has placed his charge in the hands of the next: disarmed by the innocence of the babe, this man also refrains from doing him injury, and he passes ultimately through the whole of the ambassadors, the tenth delivering him unhurt to the arms of his mother. What follows may supply you with a second picture.

The baffled Corinthians retire to a short distance, but they pause before a second door of the dwelling, and concealed within the shelter of this, Labda—who had first brought her infant forth supposing the strangers to seek it for the love they bore to its father, but had now become suspicious of their intent—hears them reviling each other for the weakness that all had displayed in sparing the child. Then, fearing they might yet return, she resolves to hide her boy in a bee-hive standing near, or as some authorities have it, in a chest.

The event was as her fears had suggested, the Corinthians came back, but the place of concealment chosen by the mother eluded their search—"The god had decreed that calamity should arise to Corinth by means of Ætion's progeny;" and the men departed to the city whence they had come, determined on reporting to those who had sent them that their errand had been accomplished.

Thus the child lived to fulfil the oracle; he was called Cypselus, from the chest, or beehive, wherein he had lain concealed; and ultimately, as most of you will remember, became the tyrant of that name, by whom Corinth was so cruelly misgoverned during thirty years.

* The student will find the three next to follow in Herodotus, Hist. book i. 34—45; book v. 92. If he prefer a translation, a faithful and good one may be found in that used by the present writer—to whom the Greek original is unknown—the work of Laurent, namely, translated from the text of Gaisford, vol. i. book i., vol. ii. book v. Oxford, 1846.

† In Homer, "Odyssey," vii. 153, we have a remarkable instance of the custom here alluded to. Ulysses, after imploring the assistance of Alcinous, seats himself on the ashes of the hearth. See Laurent's Herodotus *ut supra*, vol. i. 19, note.

‡ See Apollonius Rhodius, "Argonautics." Oxford, 1777 or 1779. See also Laurent, *ut supra*.

Admirable are the pictnres, constantly rising to the cyes of the reader, as he lingers over the noble and graceful stanzas of the "Gerusalemme Liberata." You can open no page wherein they do not abound, how then does it happen that from a book so much read in our country there is yet so little paintcd? "The Ermiuia!" you will say—and I remember that Erminia has been made familiar in our galleries; but Rinaldo, but Trancredi, but the pious Godfrey himself—to say nothing of the pagan leaders, all legitimate subjects for painting—have appeared but very rarely on the canvas. Of Olinda and Sopronia the episode is familiar to all readers, but is not so widely known in our galleries. Neither is the radiaut Armida so frequently represented as one might fairly suppose she would be, her wondrous beauty and the power of her fascinations considered. What, for example, conld you do better than exhibit her? I will not say when casting her toils around Eustazio, as she threads her way across the cronded camp, nor when she subsequcntly sets forth her plausible story before the Christian chief himself and his most trustly councilors, although cither occasion might serve your purpose well; let us take her at an earlier period, and show her listening to the lore of the Damascene Idraote, as he prepares her for that enterprise of deception which she ultimately carries out with so much success.

Hear first but some few of the words wherein our author describes this "fairest maid in all the East," as onc of Tasso's numerous translators renders his—

"Donna cui di beltà le prime lodi
Concedea l' Oriente."

One stanza shall suffice; nor is cven reqnired for the aid of your imagination, ever ready as she doubtless is to supply all riches for every need:—

"Fa nove erespe l' aura al erin disciolto
Che natura per se rineréspa in onde.
Stassi l' avaro sguardo, in se raceolto,
E i tesori d' Amore, e i suoi naseonde.
Dolee eolor di rose in quel bel volto
Fra l' avorio si sparge e si eonfonde;
Ma nella bocea ond' esee aura amorosa,
Sola rosseggia, e sempliee la rosa."*

The translation that follows is from the work of Captain Alexander Robertson:†—

"The unbounded masses of her silken hair
In wavelets, rippled by the breezes, float.
Within herself she treasures up witb eare
Looks freighted with rieh stores of amorous thought.
A rosy tint upon her visage fair
With ivory's hue is mingled and inwrought.
But on her lips, whenee breatbes a rieb perfume,
Blushes, unmixed, the simple rose's bloom."

Hear, furthermore, the opening portion of the words addressed to this fair vision by her baleful kinsman—the dark enchanter Idraote; for in them you shall find significant iutimations as to the character of beauty wherewith she is to be endowed:—

"Diee: o diletta mia, ehe sotto biondi
Capelli e fra sì tenere sembianze
Canuto senno e eor virile aseondi,
E già nell' arti mie me stesso avanze;
Gran pensier volgo, e se tu lui seeondi,
Segniteran gli effetti alle speranze.
Tessi la tela ch' io ti mostro ordita,
Di cauto veeehio eseeutriee ardita.

"Vanne al eampo nemieo: ivi s' impieghi
Ogn' arte femminil eh' amore alletti.
Bagna di pianto e fa melati i preghi;
Tronea e eonfondi eo' sospiri i detti:
Beltà dolente e miserabil pieghi
Al tuo volere i più ostinati petti:
Vela il soverehio ardir eon la vergogna,
E fa manto del vero alla menzogna.

"Prendi, s' esser potrà, Goffredo all' esea
De' dolci sguardi e de' bei detti adorni,
Sì, eh' all uom invaghito omai rincresea
L' ineominciata guerra, e la distorni.
Se eiò non puoi, gli altri più grandi adesca:
Menagli in parte ond' aleun mai non torni.
Poi distingue i consigli. Al fin le dice:
Per la fè, per la patria il tutto liee."‡

Thus rendered by Captain Robcrtson:—

"He said, 'O dearly loved! thy locks are fair,
And thy sweet face seems innoeent of guile;
Yet old tby head, and bold tby heart to dare;
And skillcd art tbou in every virgin wile,
By thy assistanee I great plans prepare,
Great ends I bope to gain if fortune smile.
Weave thou the web, as my advice direets;
Boldly perform what timid age projeets.

"'Go to tbe hostile camp, and practise there
All arts of woman that to love allure;
Let tears flow freely, speak soft words of prayer,
And mingling sighs with broken words, adjure;
So sball the charms of beauty in despair
By love or pity hardest hearts secure.
Let modesty your daring hopes disguise,
And spread tbe garb of truth o'er all your lies.

"'Endeavor first Godfredo to ensnare
With sweetest smiles by flatteries endeared;
For men who love, from war would fain forbear,
And in war's toils have seldom persevered.
If he resist, some of his ehiefs lead where
They may be kept seeure, and no more feared.'
He otber counsels gave; and lastly said,
'All things are rigbt our king and faith that aid.'"

Differing entirely in character, bnt of equal merit, and equally appropriate to the pnrposes of the painter, is that passage in the eleventh canto, which describcs the assault on the walls of Jerusalem, wherein Godfrey appears in person, and is wounded by Clorinda. First you have the bold and beautiful amazon, her bow, menaciugly bent on the Chrisitan assailants, in her hand:—

"E di maechine e d'arme han pieno avante
Tutto quel muro a cui soggiace il piano:
E quinei, in forma d'orrido gigante,
Dalla eintola in su sorge il Soldano;
Quindi tra' merli il minaeeioso Argante
Torreggia, e diseoperto è di lontano:
E in su la torre altissima angolare,
Sovra tutti Clorinda oeeelsa appare.

"A eostei la faretra e 'l grave incarco
Dell' aeute quadrella al tergo pende.
Ella già nelle mani ha preso l' arco,
E già lo stral v' ha sulla corda, e 'l tende:
E disiosa di ferire, al vareo
La bella areiera i suoi nemici attende.
Tal già credean la vergine di Delo
Tra l' alte nubi saettar dal cielo."§

Rendered by the same translator in the verses that follow:—

"On the north wall there had been stored before
Missiles, and every speeies of maehine;
There, rising like a horrid giant o'er
The wall, was, from the waist, the sultan seen;
There, 'twixt two merlons standing, like a tower,
Far off was seen Argante's threatening mien:
There, on tbe loftiest tower, where ends the wall,
Was seen Cloriuda, far above them all.

"Her quiver, with sharp pointed arrows stowed,
Was from her back—a weigbty load—suspended.
A shaft sbe ehooses, fits it to the eord,
Already in her hand tbe bow is beuded:
Thus eager to repel her foes abborred
The lovely arcber their approach attended.
So was erewhile the maid of Delos seen,
When from the elouds she showered her arrows keen."

Thus prepared, the fearlcss amazon receives her enemies; and constautly aiming at some prominent leader, has laid many among the noblest of the Christian captains low: Clothaire, Ademar, the Count of Amboise, and Palamede, have already fallen, when Godfrcy himself, advancing towards the tower she thus stubbornly defends, and which now secms tottering to its

* Tasso, Ger. Lib. eanto iv. stanza 30.
† Edinburgh and London, 1853.
‡ Tasso, *ut supra*, eanto iv. stanza 24–26.
§ See eanto xi. stanzas 27, 28.

fall, is wounded by one of those unerring darts. The state of things, as required for your purpose, is described as follows:—

"Così la torre supra, e più di sotto
L' impetuoso il batte aspro ariete;
Onde comincia omai forato e rotto;
A discoprior l' interne vie secrete.
Essi non lunge il capitan condotto
Al conqnassato e tremulo parete,
Nel suo scndo maggior tutto rinchiuso,
Che rade volte ha di portar in nso:

"E quinci canto rimirando spia,
E scender vede Solimano abbasso,
E porsi alla difesa ove s' apria
Tra le runie il periglioso passo;
E rimaner della sublime via
Clorinda in guardia e 'l cavalier Circasso.
Così guardava; e già sentiasi il core
Tutto avvamphr di generoso adore.

"Onde rivolto, dice al buon Sigicro
Che gli portaua un altro scudo e l' arco;
Ora mi porgi, o fedel mio scudiero,
Cotesto meno assai gravoso incarco;
Che tenterò di trapassar primiero
Su dirupati sassi il dubbio varco:
E tempo è ben, ch' alcuna nobil opra
Della nostra virtute omai si scopra.

"Così, mutato scudo, appena disse;
Quando a lui venne una una saetta a volo,
E nella gamba il colse, e la tra trafisse
Nel più nervoso ov' è più acuto il duolo.
Che di tua man, Clorinda, il colpo uscisse,
La fama il canta, e tuo l' on n' è solo:
Se questo dì servaggio o morte schiva
La tua gente pagana, a tes' asariva."*

Translated by Captain Robertson in the stanzas that follow:—

"The tower above, still more the ram below,
Battered the wall; this, shaken to the base,
Began, through perforated rents, to show
The paths it screened, and the internal ways;
Godfrey, who thought it near its overthrow,
Approached the wall, its shaken strength surveys,
Completely covered by an ample shield,
One seldom used, which all his form concealed:

"With cautious eyes examining the rent,
He from above saw Soliman descend,
And 'mid the ruins his bold front present,
Resolved the perilous passage to defend.
Clorinda, to protect the battlement,
With the Circassian cavalier remained;
This seeing, he already felt within
A generous heat to fire his heart begin.

"The good Sigiero then, who bore his bow
And a light shield, did Godfrey, turning, say,
'O faithful servant, let me now forego
This shield for one more light, that so I may
First mount the breach, and to the host first show
Amid these toppling stones a dubious way:
Full time it is, by some illustrious deed,
My valor should be shown to those I lead.'

"Scarce had he changed his shield, had uttered scarce
These words, when from the walls a shaft they shoot
Which struck the chief, and deep his leg did pierce
Where nerves abound, and pain is most acute.
By thee, Clorinda,—so does fame rehearse,—
The wound was given; all the renown impute
To thee alone, that death and servitude
Did, on that day, thy pagan race elude."

No lack of pictnre for him who revels amid the rich pages of Tasso, as even from these few passages is proved abundantly. Others of the Italian poets present them in almost equal abundance; yet is the writer compelled to admit that in Dante alone will you find matter of equal interest. Many are the striking portraitures whereunto we would fain direct yonr attention in the last-named author; but, for the moment, let us bestow the small space yet remaining to us on another, also mnch admired by excellent judges, although by no means so well beloved by your poor scribe and servant now in presence.

* Tasso, canto xi., stanza 51 *et seq.*

In the latter part of the twenty-ninth, and the first stanza of the thirtieth canto of his "Orlando Furioso," Ariosto—to whom it is that we refer—describes the following, among other strange vagaries performed by the Paladin in his madness. He has dragged the dead palfrey of Angelica† to a broad estnary of the sea, where—

"Gli fu forza il cadavero lusciare,"

says the poet, "he was compelled to leave the carcass," since he can no longer drag it onward. He then crosses the river by swimming, an accomplishment wherein he is equal to the otter, says Ariosto; and on the shore thus gained, he finds a shepherd mounted on a good horse. To this man Orlando approaches with the following words:—

* * * * *

"Vorrei del tuo ronzin, gli disse il matto
Colla giumenta mia far un baratto

"Io te la mostrero di qui, se vuoi;
Che morta la sull' altra riva giace:
La potrai far tu medicar di poi
Altro difelto in lei non mi dispiace
Con qualche aggiunta il ronzin dar mi puoi
Smontane in cortesia, perchè mi piace.
Il pastor ride, e senz' altra risposta
Va verso il guado, e dal pazzo si scosta.

"Io voglio il tuo cavallo olà! non odi?
Soggiunse Orlando, e con furor si mosse,
Avea un baston con nodi spessi e sodi
Quel pastor seco, e il paladin percosse.
La rebbia e l' ira passò tutti i modi
Del Conte." . . . .‡

This, to him who shall make choice of the snbject, is perhaps the most favorable moment for his purpose. Useful studies of muscular action, or of the animal form in death, might perhaps be deduced from the earlier portion of the passage; and the approach of Orlando to the brink of the river might, for those purposes, be judiciously selected as a second subject—but this is a question that may safely be left to the taste and judgment of the stndent.

Turning from the Ansonian poets, and seeking other climes, let us try whether we may not find something to onr pnrpose in a work, greatly admired at the time when it was first made known to the English public, bnt which has not attracted mnch attention from onr students in Art, so far as the present writer has been able to ascertain. We allnde to the Swedish poem of "Frithiof," the most important production of its author, Esaias Tegner, Bishop of Vexio, and, in the estimation of his compatriots, the first poct of Sweden.

The tale related is one of trne love; but within it—and wherefore should there not?—are interwoven words of eternal wisdom: here, for example, are a few of those uttered by Thorsten Vik-

† See canto xxix., stanza 67, *et seq.*

‡ Not being able to obtain one of the accredited translations of Ariosto in time for the present occasion, the writer substitutes the following, in preference to leaving any reader, who may prefer an English rendering to the original with his desire unfulfilled:—

"I want thy wretched horse!" the maniac cried,
"Dismount, and take thou mine—there, on the stream's far side

She lies, stark dead. Thou'lt cure her at thy leisure;
No other fault she hath. Haste, give me thine,
With aught beside in fair exchange—the measure
I make not too exact—so thou incline
Thy will in duteous haste to do my pleasure.
Give me thy horse, I say, and take thou mine!"——
The shepherd hears, then silently rides on
Smiling, and to the water-side is gone.

But after him Orlando. "Halt! ho there!
Dost thou not hear me, man? I want thy horse!"
Then doth the swain his knotted staff prepare
To strike the Paladin.—The raging force
Of that blind fury, words may not declare,
Rushing, as this he saw, with headlong course
Thro' the mad Count's hot breast—he springs to meet
The upraised hand ——————.

Canto xxx., stanza 5, *et seq.*

ingsson to his son Frithiof, the hero of the poem. Let us premise, for the better comprehension of such as do not know the work, that Thorsten is the vowed friend, the "warrior-brother" of King Bele, who has called his own two sons, together with the son of Thorsten, to receive his dying farewell; that part of the ceremony—of which you shall presently have a slight description—concluded, Thorsten speaks, and as follows:

"Thereafter uprose Vikingsson—he spake in manly tone—
'It seemeth ill that Bele king must pass away alone;
We twain have shared the chances of life's adventurous game,
And time is coming fast, when we may share our death the same.

"'And length of days, son Frithiof, hath told a tale to me,
And whispered many warnings, which now I give to thee:
As Odin's black-winged messengers descend upon the tomb,
So on the lips of aged men there sits the surest doom.

"'First, *hold the holy gods in awe*—in awe for good and ill,
Like storm and sunshine come of heaven, and visiting at will.
The eye of heaven sees the thoughts that dwell within the mind,
And later days repay the sins of years that lie behind.
* * * * * * *

"'Thyself shalt die, and all shall die belonging unto thee,
But one thing mark me, Frithiof, shall live eternally—
The judgment over dead men; so strive both day and night
To think the thoughts of noble minds, and do the thing that's right.'"

Here, you will say, is no picture, and you are right; but preceding these are lines wherein you will find a highly effective one, setting before us all the chief characters of the story—one only excepted, who shall appear in due time. The words are these:—

"King Bele stood in council-hall, he leaned him on his glaive,
Beside him Thorsten Vikingsson, that Bretwald* hold and hrave;
His aged warrior-brother, a hundred years had he,
With scars like runes, and hoary hair, so silver white to see.

"They stood within the presence-hall, their looks were haught and high,
Were like two ancient heathen shrines, that half in ruins lie;
* * * * * * *
* * * * * * *

"Then king Bele was first to speak—'My days are well nigh sped,
The sweetest mead is tasteless now, my helm weighs down my head;
But even as each earthly bliss is fading into gloom,
Valhalla seems more bright and clear—I turn me towards the tomb.

"'And hither have I called my sons, and called me also thine,
That each may hear in heedfulness these latest words of mine;
That I may speak, admonishing, before those eagles young.'
* * * * * * *

"So as the king had bidden them, they entered in the room;
The first and foremost Helge came—a man of craft and gloom;
He loved to live with priest and seer, and by their altars stand;
He came from groves of sacrifice, and blood was on his hand.†

"And after him came Halfdan, a light-haired youth was he,
His looks had come of nohle blood, yet looked he womanly;
It seemed as tho' the sword he wore had hut heen donned in jest,
He looked like maiden fair, disguised beneath a hero's vest.

"The last of all came Frithiof—he wore a garh of hlue,
Was taller by a head's height than the taller of the two;
He stood between the brethren twain, as day, so calm and hright,
May stand hetween the ruddy morn and dark discolored night."

To these youths, thus assembled, the old monarch addresses words of wisdom, adapting his counsels to the necessities arising from the character of each listener, thus, to the elder he says, remembering his narrow and ascetic fanaticism:—

"'The Godheads great, O Helge king, in Disarsala‡ dwell,
But not as snails or limpets do, in close and shut-up shell;
As far as day's glad light may shine, as far as sound may fly,
As far as thought may wing itself, are Godheads great and high."
* * * * * *

And further, referring to the harshness and cruelty which subsequently appeared in the character of the elder son, he says:—

"'Be not too stern, O Helge king, yet ready to defend;
The swords that be the best to bite, are aye the hest to bend.'"

with much beside to the same purpose.

To the lightness of his younger child the wise parent applies an exhortation to more earnestness of purpose, in the lines that follow:—

"'O Halfdan, mark! a joyful mind is e'er a joyful thing,
But levity befitteth none, and least of all a king;
With hops and honey, well combined, the hydromel is made,
Put greatness in thy sports, my son put steel into thy blade.'"

The old men die, and the young men enter on their inheritance, of which, in Frithiof's case, a somewhat minute description is given; but we are seeking pictures, and must not be delayed. Here is one that shall bring our heroine into presence:—

"In Hilding's hut, and Norway's clime,
Grew two sweet plants, in perfect prime;
And ne'er before were fairer given
To smile on earth, or gaze at heaven.

"There grew the sturdiest of them,
Like sapling oak with spear-shaped stem,
Whose crest, as e'en a hemlet's glancing,
Wooed each wild wind to keep it dancing.

"And one was like a rose:—the day
That Christmas chills have passed away,
And spring, within its burning bosom,
Dreams of its fast unfolding blossom.

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"I say they grew towards flowers and fruit,
And Frithiof was the sapling shoot,
And Ingebore the rose that vied it,
The lovely rose that blushed beside it.

"Who sees the pair while sunbeams shine,
May deem himself in Freya's§ shrine,
Where urchin Loves be deftly going,
With wings of light and tresses flowing.

"Who sees them with the pale moonlight,
To lead their dancing steps aright,
May deem there trips it light and airy
The Elfin King and Queen of Faëry.

"What Frithiof learned the day before
He taught the next to Ingebore;
And proud was he when Bele's daughter
Had learned the runes that Frithiof taught her."

Here have you choice of season and occupation—sunshine or moonbeam; the light sports of childhood, or labor—light as they, with beauty in each and all: the painter has mistaken his vocation if he do not long to reproduce every fair moment so charmingly depicted by the poet. Two more delicions scenes for him whose love is for the ocean or the gladsome river, and then we pass on:—

"If long and late they sat afloat
On dark hlue sea, in rudest boat,
It pleased her, as the sail was filling,
To clap her hands and help its swelling."

Or again, and think only what the fiords and streams of Norway give you as the site of what follows!—

"When floods were deep and streams were hoarse,
He bore his tender charge across,
Pleased if the currents lashed around him,
And her small arms the tighter bound him."

Oh for your genius, sons of blessedness that ye are! all true artists. Would that your power had been the appanage of this your scribe! what galleries would not then be mine to wander

* *Bretwald*, or *Bretwalda*—a leader or chief.

† This may serve to show that it was not with the priest of a true religion, the seer of a pure creed, that the darksome Helge loved to dwell. Our author is indeed not the man to intimate disrespect of aught truly venerable, as will become obvious in our further progress.

‡ *Disarsala*—the Hall of the Gods.

§ Freya—the Scandinavian Venus. See Latham's "Frithiof," notes, p. 199.

through in joy perpetual! But no, for me they may but stretch their clustering columns in the light that imagination lends them; to you alone belongs the magnificent destiny of realizing what for the common world is but a more radiant manner of dream.

And so be it! Do you but work for us only; suffer not that all our aspirations return unsatisfied to earth: give to a life of ages on your canvass, if it be but a portion of the good and beautiful that we cannot else retain beyond the fleeting moment, and your hearts shall rest content therewith, no less than our own.

But our Frithiof!

Yes; he is not forgotten. You next have him standing before the brothers who have succeeded to Bele's throne: he is there to demand the daughter of Bele, promised by their father. Hear some few of the words he addresses to Helge and Halfdan:—

"'Chieftains,' he said, 'the royal maid
Is very dear to me,
And here I come to claim her home,
A lovely bride is she;
On Bele's laws I plead my cause,
He wished such match to be.'"

More follows, but this shall suffice. His Ingebore is refused to him, and he departs in anger, uttering words of defiance. An aged suitor, King Ring, then demands her hand; but he too is rejected, and Ingebore is sent for safety to the shrine of Balder, where she is visited by Frithiof. For a description of that "Meeting," I refer you to the poem;* but in consequence thereof Helge subsequently accuses Frithiof of sacrilege. The surrounding warriors urge the hero to deny the charge, which they believe to be false:—

"'Frithiof, say No! and Ingebore is thine!'"

they exclaim, but Frithiof replies:—

"'No hope or fear can be
In earth or heaven to wring one lie from me:
I saw thy sister, Helge. Eve was come,
'Twas then we met, and under Balder's dome;
But not in sacrilege or sin—unless
The simple meeting shook his holiness.'"

The warriors now all shrink from his side as from a thing accursed. Helge imposes what he believes to be an impossible task by way of pennance, and Frithiof retires in rage and despair. He then repairs once more to the shrine of Balder, where he relates what has occurred, to his Ingebore, whom he implores to join her fortunes to his own at once. Unconvinced by the many causes assigned by Ingebore for her refusal, Frithiof is then leaving her in "high disdain:"—

"He cursed himself, for that he strove to move
So much of prudence and so little love.
Then from his lips these savage accents fell,
'Farewell, King Helge's sister, fare thee well!'"

But not so can his hapless betrothed endure to see him part; her words arrest his steps:—

"'Oh, Frithiof! Frithiof! must we part us so?
Hast thou no kindlier look before we go?
No softer word to soothe the soul's unrest
Of that fond maiden who hath loved thee best?
Deemest thou I lie on roses, and can see
My life's whole hope departing smilingly;
And lightly tear from an unbleeding heart
What grew with it, and never dwelt apart!'"†

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These gentle entreaties, with more of similar import, prevail. Frithiof acknowledges the power of the Nornas, or Destinies, and they separate; he to attempt the achievement of the task imposed by Helge, his Ingebore to become eventually the prize of the aged, yet brave and noble warrior, who obtains her from her brothers "by his spear and his bow." Here for the present we must leave them, but may possibly recur to the subject.

* See "Frithiof," Latham's translation, canto v., p. 50.
† See p. 75.

CÆSAR DUCORNET, THE PAINTER.

One night in January, 1806, a poor women, residing in a very humble abode in the city of Lille, was about to become a mother. When an event so important occurs in a family, whether it be prosperous or miserable, there is a something in it so touching to the heart, that all the people hail it as a blessing.

So, then, on the evening we speak of, the moment was come when privation and misery, anxiety and pain, all were about to be forgotton. The poor women was in the very crisis of her travail, the happy father was kissing his dear mother-in-law, when a shriek put an end to his joy: the little stranger had come into the world without arms.

This little babe was destined to become the great painter Ducornet.

Poor thing! he looked very helpless, but his very misfortune proved the beginning of his fame—it made people speak about him. Was not that an advantage in our day?—are there not many longing for celebrity who would gladly buy it at the same price? He was born likewise with half legs only: the upper part, by some extraordinary freak of nature, had been left out of his organization. He had feet, however, but only four toes to each—a big toe and three little ones; and with these our little hero—. But we must not anticipate.

From his infancy, before he could have understood the precious consequences, Cæsar contrived to impart to his feet the greatest dexterity—we had nearly said handiness—in playing at marbles, spinning peg-top, and in performing all the little sports of his age. He was a quick scholar at college, and M. Dumoncelle, his writing-master, wanted to make him one of the craft; but his vocation was already chosen. A nobler art had already touched his soul—the sight of pictures had quickened his own genius and little Four Toes was an artist himself.

On one occasion, after he had been absorbed for hours in admiring the sublime portrait of Christ by Vandyke, at the Gallery of Lille, he resolved that he would be a painter, nothing but a painter, whatever pains it might cost him.

In the meantime the writing-master, Dumoncelle, complained most bitterly that his favorite pupil neglected his own beloved art of caligraphy, and did nothing but scrawl men and women in his copy-books. Amongst others the angry writing-master, in the extremity of his wrath, sought the sympathy of Watteau, who at that time superintended the School of Design at Lille.

"Good! excellent! capital!" cried Watteau, delighted as he examined the little sketches; and the consequence was that little Four Toes, or Cæsar Ducornet, as they called him by name, became a pupil of the drawing class. In less than eighteen mouths he had succeded to win all the prizes but one.

Some years later, the Duke of Angouleme, passing through Lyons and seeing his work, was so deeply interested by his genius and natural infirmity, that he offered to carry Cæsar to Paris. Little Four Toes declined the gracious offer, not wishing to quit his native town until he carried off the great prize of all. He did soon after, and then the young painter took his way to Paris —that city of the humanites, where merit of every kind is sure to be fostered.

Ducornet was received into the Academy of Fine Arts, as the pupil of Gerard. He soon obtained a medal of the third class; then one of the second class; after that a penison on the Civil List; then an order from M. de Labourdonnaye, home minister, for the picture of "Saint Louis dispensing justice beneath the oak."

In 1829, when he was only twenty-three, this wonderful man competed for the great prize of Rome, and got an equivalent for the second prize. His competing picture, "Jacob refusing to let his son Benjamin depart." "was exhibited for the benefit of the poor, and a good subscription was the consequence.

Thus he, who might naturally have been an object of charity himself, was on the contrary, its distributor. What a lesson to those who have all their limbs to labor with, and cannot even earn their own bread!

Louis Phillippe, in 1852, gave him an order for a portrait. Whilst occupied in painting it—and his father who was almost

perpetually by his side, happening to be absent—Cæsar Ducornet, for the first time. snatched up his pencil with his teeth, and painted as skilfully as he had hitherto done with his feet!

The talent of this singular artist is full of thought, poetry, life, and expression; his coloring is perfect. As to his figure, he is not four feet high; his body is slendor, his head large, full, and grandly developed, as phenologists would say. His voice is powerful, sonorous, his conversation lively, and replete with happy thoughts and lively sallies. A stranger expects to see in him something disagreeable. But no, he thinks otherwise when he cnters his atelier and his eye alights upon Cæsar holding his coloring-board with one foot, and his pencil with the other. His look is very picturesque, and many beautiful women and ladies of rank visit him to enjoy his lively sensible *chit-chat.* If any of his particular friends call upon him, he always presents a *foot* with great cordiality, and shakes him by the hand.

What a heart hc has for true love and affection! His father has hardly once quitted him for a moment since his birth. In order to preserve the delicacy of his touch, he must abstain from walking; his father carries him from place to place. Thus they are always together, two bodies with one soul; you cannot see one without seeing the other. To part would be death to either of them!

From the Journal of the Phot. Soc.

"PATENT" INJUSTICE.

To the Editor of the Photographic Journal:

Glasgow, August 12, 1856.

Sir,—The patent that "Alpha" complains as coming in the way of his inventive genius, has nothing to do with the practice of photography: it it as free to "Alpha" to follow in all its details as ever it was. The protection which Mr. Urie, of Glasgow, who has patented the relievo process, claims, is for the artistic finish of his pictures after they are taken. Every artist can be protected in his works; so are authors, &c., and very properly so. It would be very hard, after an individual has perhaps at great trouble and expense made any discovery or improvement in any article, that as soon as it became public, parties of no principle should step in and appropriate it to themselves the profits which in all justice belong to the originator. It is much easier at all times to copy from the works of others, and save an immese amount of trouble, than to design for themselves. It would be a foolish waste of your space in me to argue such a self-evident statement; it is only to be regretted that there are so many unscrupulous individuals in the world that honest men require to be protected against. If the process in question is of so little value as "Alpha" would have us believe, and only serves the patentee as an advertising card, why trouble himself or you with what is of so small account? Mr. Urie ought to be the best judge of that; and I am assured that, though for time the process was uot so successful as it ought to have been, owing to his being unable to procure qualified parties for the artistic department, yet since he has succeeded in doing so, within the last twelve-months, they have averaged fully fifty per cent. of the work sent out of his establishment, and that is the largest, by a long way, in Scotland, or perhaps in Britain. Mr. Urie never refuses to grant licences to artists fully quallified to do justice to his patent, but to iucapables he ever refuses. Having made that style of finish entirely his own, and his name being so intimately connected with it, you will at once see the propricty of his being careful to whom he grants a licence. But Mr. Urie's patent does not exhaust the capabilities of what photography is capable of in the way of color. I myself have practised much as an artist in photography, and I can assure you there is no end to what can be done by an artist in that way. I have colored with very fine effect—and the processs "Alpha" is welcome to—in this manner. Coat the back of your positive with black varnish, color the face, hands, &c. with the usual powder color, then paint in your background either plain or with accessories, according to taste, with the usual water colors, with which is mixed a good deal of chincse white to give it a body, as transparant color does not do so well; when properly dry, go over the background with clay color, rubbing it in pretty stiff, and bring up to the tint or tone desirable. In the hands of an artist, the above is a quick and very effective process: there are many other ways, and combination of ways, which will readily occur to the mind of an artist, without infringing on the lawful rights of others.

With respect to the non-inverted camera, the same has been in use for a considerable time past in Mr. Urie's establishment, and is pretty generally used iu Scotland, and from an advertisement in your last Number, seems not to be unknown on the other side of the Tweed. I regret having to trouble you with so long a communication, but it is necessary to defend the character of a gentleman, who has done more to advance the art than half of the practitioners in Scotland put together, from the charge of obstructing it.

I am, Sir, yours &c., Omega.

["Omega" must pardon us for omitting from his defence certain paragraphs not essential to it. With this letter, for many reasons, the subject had better come to an end.—Ed. P. J.]

From the Jour. of the Phot. Soc.

ON THE CRACKING OF BLACK VARNISH.

To the Editor of the Photographic Journal:

Dublin, August 11.

Sir—We have, thanks to your Journal, now no lack of information on subjects connected with the formation of photographic pictures and the preservation of those on paper has been made the study of special committee. But the photographer who devotes himself to the production of positives upon glass, cannot shut his eyes to the fact, that when chemistry and optics avail his picture no longer, there is no one to interest himself is its fate. So he pours on his portraits the same black varnish that he poured on four years ago, with certainty that sooner or later—generally sooner—they will present a beautifully reticulated appearance, pleasing enough to be sure to the disinterested observer, but anything but consolatory to the artist, or flattering to the sitter. It is true that in these pages have appeared different methods of "backing positives," but for the most part they seem to have originated in the lazyness rather than the industry of their projectors. One recommends us to use black velvet: we do so, and find it full of minute white specks which no brushing will remove; another, to employ a water-varnish, which, as soon as dry, splits completely off the plate. Nor can we forget the gentlemen who tells us to smoke our pictures over a candle. Thus between the two stools of varnish and velvet; positive photography falls to the ground and gets into disgrace The "black backing," howevever, generally adopted by photographers, consists of asphaltum dissolved in coal-tar naphtha. Asphaltum is of two kinds, natural and artificial. Natural asphaltum, or bitumen Judaicum, is a hard brittle substance of a brownish, rather than black color, and having a conchoidal fracture. It is soluble in chloroform, ether, the fixed and volatile oils, alcohol, benzole, and coal-naphtha, as also in solutions of the caustic alkalies. The artificial variety is met with much more frequently in commerce; it is in larger pieces, less friable, blacker, and without the conchoidal fracture. It is obtained as a residual product in the distillation of coal-tar, while the natural variety comes from the shores of the Dead Sea and the bitumen lake of Trinidad. Both these substauces are largely employed in the manufacture of japans and varnishes, the solvent being turpentine, and the cracking prevented by the addition of a fixed oil. This answers the purpose perfectly, but would render the varnish completely useless to the photographer, as apart from the time required for it to dry, the presence of a fixed oil would, by its decomposition, rapidly deteriorate the deposit of silver. Amongst other varnishes which I tried in the hope of finding one free from objection was gold-size, rubbed smooth upon a stone with ivory-black. This is perfectly opake, but takes too long to dry.

Now the only objection (barring the smell) to the ordinary asphalt-varnish is its tendency to crack. So I then tried the addition to it of some substance which should remove this defect. Indian rubber and gutta percha failing, I had recourse to Canada balsam, and to my satisfaction found that I had a varnish which possessed the three great requisites of opacity, rapidity of drying, and toughness.

The proportions which I employ are as follows:—in 4 fluid ounces of the naphtha-varnish dissolve 6 drachms of Canada balsam at the ordinary temperature. If evenly applied and exposed to the air it will dry in ten minutes, and some experience in its use enables me to say that *it will not crack.* At first I was at a loss to discover the cause of this cracking or splitting (it is too well known to need description, but it afterwards occurred to me that by the rapid evaporation of the solvent the asphalt was left on the plate in a state corresponding to that melted glass which has been suddenly cooled, as instanced in Rupert's drops and the Bologna phial, and this conclusion was borne out by the fact that this splitting does not come on gradually, but by a sudden impulse at once, and I also noticed that it may be induced, so to speak, artificially, by suddenly heating the plate or even striking it sharply.

I am not an advocate for the use of black varnish at all, preferring colored glass, and not caring for the reversal of the picture, a disadvantage, if any, fully compensated for by the superior delicacy and softness of the image when seen with but one glass interposed between it and the eye, and the consolation of knowing that my picture is as permanent as glass and silver possibly can be, yet I offer these hints in answer to the inquiries of those who still adhere to the plan of "varnishing on the collodion side." H. Draper.

To the Editor of the Photographic Journal:

Sir,—Having observed in the Journal of July some remarks about the cracking of varnish for positives, I wish to call your attention to the use of elastic gums.

I have a collodion positive backed with a solution of asphalt in mineral naphtha, with the addition of a small quantity of caoutchouc dissolved in the same menstruum, which was done about this time last year. At present it does not show the least flaw. Caoutchouc is preferable to gutta percha.

Coal-tar pitch and caoutchouc dissolved in chloroform gives a good backing for positives.

I should think that a small quantity of caoutchouc, dissolved in chloroform, added to the amber varnish, is also applicable to the negatives.

As regards the bluish tint noticed by Mr. Starling, may it not be attributed to a deposition on the collodion of ferrocyanide of iron, which would be avoided, by great care, in washing the plate well with distilled water after the developing solution before using the cyanide bath?

Yours respectfully, C. R. C. Tichborne.

We have been favored by the communications of numerous other correspondents containing many valuable suggestions and recipes for the prevention of the above annoyance, and we should have been glad to have inserted the whole *verbatim et seriatim*; but this would have occupied the space of an entire Journal, and we feel sure, therefore, that we shall have the writer's forgiveness if we merely insert the essential part of their letters; and that they will believe that we are none the less obliged for the great trouble they have bestowed in endeavoring to solve the difficulty and assist the sufferers. We are the more induced to adopt this plan of epitomizing, as the case is one of pressing importance to many, and the postponement of the information (which would be inevitable if inserted at full length) would be unfair and perhaps seriously inconvenient to those in difficulty.

Mr. Napper recommends the addition of 1 oz. of beeswax to 4 or 6 oz. of asphaltum dissolved in turpentine, and states that pictures taken by him in America, six months ago, still remain uninjured.

Mr. Akester gives the following receipt (which agrees with Mr. Tichborne's): 1. Dissolve about 1 oz. of india-rubber in about 1 oz. of mineral naphtha. 2. Dissolve 4 oz. of asphaltum in 2 oz. of mineral naphtha, to which add from 2 to 4 oz. of the solution of india-rubber. The cracking he attributes to the back getting damp and afterwards drying, and he recommends pasting paper behind pictures varnished.

Mr. Monson advises the same, with the difference of gutta percha for india-rubber.

Mr Parker has pictures backed with the best asphaltum, powdered very fine and dissolved in common spirits of turpentine to the consistency of tar, which have now stood nearly a year.

Another correspondent has found a complete remedy in the use of benzole or naphtha as a dissolvent; he prefers the former, and it dries nearly as quickly as spirit varnish. Take 8 or 10 oz. of benzole or naphtha, add from ½ oz. to 1 oz. of gum dammer powdered; then add asphaltum powdered, sufficient (when dissolved) to run easily over the plate. If too thick, reduce with benzole or naphtha.

Mr. Blackwood, jun., accounts for the cracking by the non-elastic nature of the dry varnish, and its contracting properties in the process of *perfect* hardening and recommends one possessing opposite qualities, such as the *best* black japan used by coach-makers. He has specimens so varnished from the first date of the collodion process, in which as yet there is no trace of cracking. The varnish should be poured on the plate is sufficient quantity to cover it easily, and allowed to drain at one corner for a few minutes, so as to have a body of japan and not a mere film, and it should then be dried with a gentle heat for two or three hours, or it may be allowed to stand for a day or two without artificial heat. It is as well to paste thin paper over it to prevent its sticking to anything while not thoroughly hardened. If the cracks in the varnish are not of long standing, a layer of japan over it will put it to rights again, and will improve, if not quite remedy, those cracks, which have been for some time in existence. This process, however, will hardly meet the requirements of those who want a rapidly drying varnish. It is also suggested that linseed oil added to the black varnish will prevent it from cracking, but this also will take some time to dry.

THE WASHINGTON GALLERIES.

Washington, D. C., Aug. 31, 1856.

Mr. Editor—*Dear Sir:* As I had a few hours to spare while here, I visited the various Photographic galleries of the city, and will now send you a few notes I have made upon them. If you approve of them scatter them to the four quarters of the earth, by printing them in your widely circulated Journal. I have been struck, sir, with the fact, that wherever I found an artist of taste, and consequently a successful one, I found—with but few exceptions—the *Photographic and Fine Art Journal*. They *wait* for it with a degree of *patience* that only photographers *possess*; but when it does come, it comes greeting like a shower of rain after a dry spell. I have been surprised after meeting so many intelligent artists, that you have not more contributors to the Journal. I claim to be somewhat of a physiognomist, and I will risk the little reputation I have for that science, by making this broad assertion, that if all photographers who could write would write, the *Photographic and Fine Art Journal* would be as interesting as any periodical of the day, and certainly much more useful. There are at present eight galleries in Washington; one of them is carried on by a lady, which gallantry would require me to notice first, and also as it comes first being situated near the city post office.

The cleanliness and order of the establishment, indicate the attention of a lady, yet I cannot praise the specimens as I should like to. They have the appearance of being second hand and very scarce at that. A few ladies weighed down with paint and jewellery—one or two fast young men with cigars in their mouths—a view of the tops of two or three houses in the neighborhood, and a few wretched bad copies of wretched bad prints, make up the sum and substance of Mrs. Redman's specimens.

Mange.—I thought it would not do to slight even the *lowest*, so I went up and found some strange pictures hanging around; a sort of "run wid de ingine boys," and their rosy-cheeked

sweet hearts. The pictures were all quite small, and of about the size of a *small potato*, except here and there a copy of an outrageous bad print. This operator is capable of better things, and I would recommend him to close doors and practice the art until he can make something that looks a little more like a picture ; to be sure, his price is not extravagant, only *fifty cents*. Yet still he can afford to give a little better picture for *fifty coppers*, and then make more than his customers do by the operation. I was very much amused at the appearance of a young lady screwed up into an attitude to have a "pretty picture taken." She seemed to be as well satisfied as though it was really going to be done. Before the glass was another of rather large dimensions, arranging herself and jewelery, so as to show off to the best advantage, on polished metal. While a third who had probably gone through all of this fixing, was very busily engaged in trying to pinch up color into her cheeks, seemingly to make them vie with a bunch of roses she held in her hand.

Vanable.—Here is a gallery that looks as ancient as Pompeii, and like Pompeii is full of ruins ; and yet you might excavate through dirt up to your eyes, without finding a single *work* of *Art*. I wiped the dust from the *outside* of several pictures, sufficient to see that they were intended for daguerreotypes, and hurried away.

Root & Co.—This is a new establishment. The pictures I saw were good, mostly daguerreotypes, and a few touched and untouched photographs. The facilities of this establishment to get up good pictures of all the various kinds are not excelled, and when they get in full blast, we may expect to feast our eyes.

Page.—The specimens at this establishment, as might be expected from the high reputation of this gentleman as an artist, are very fine. He has been very successful in getting good and durable pictures of our great statesmen, Webster, Clay, Calhoun, Jackson, &c., but to give even their names would occupy more space and time, than either you or I can spare for the purpose. Mr. Page is one of our oldest photographers, and if we may judge from the hundreds of pictures which adorn his gallery, we must conclude that he is one of our best; and although but one *page* himself, it would take a small volume to give anything like a fair and full description of his pictures. His photographs are fine, but his ambrotypes are not so good as I expected to find them.

Vannerson.—His specimens here, like his neighbor, Page's, are principally daguerreotypes of public men, and are so generally good, that it would be difficult to pick out any particular one to praise; I will not therefore make a selection. The photographs are few but good, and everything is clean and in business-like order.

Whitehurst.—This seems to be *the* gallery of the city; everything looks business-like, clean and neat. I was surprised at the business they were doing, until I saw the operators, and then the mystery was out. I thought to myself, that if a gallery could not do business with such polite and gentlemanly operators, that there was no business to be done. Their pictures are equal to their politeness, *smooth and highly polished*. Ambrotypes have not yet found favor with Mr. Nimms. Mr. H. O. Neal is the photographer; call on him when you visit Washington, you may find his hands blackened up a little with nitrate of silver, but I can assure you, that you will find his heart, as well as Mr. Nimm's, free from blemish, and beating high for the advancement of the Art. Among the many pictures worthy of notice, I saw one that seemed to clap the climax ; it was a full length untouched photograph of Miss Virginia Kemble. I think it is the most beautiful untouched photograph I ever saw. There are many other notable and well finished pictures in this spacious and artistic gallery; and if not all gems, they come as near to it as any collection of the same size I ever saw.

Carthy.—This is really going from the sublime to the ridiculous. I went up, up, up, until I thought I never would get to the picture man. At last I arrived at the "please walk in;" I did so, and was greeted by some wild portraits painted in oil; these portraits were very highly colored in red and blue, and it is difficult to tell which of the two colors have the ascendancy, the red or the blue. The daguerreotype specimens were uninteresting, dull and dirty; even the subjects with thin wry faces, appeared to know this fact, and kept up a continual frowning, as though they were ashamed of their dirty faces and of each other's company. Too much mercury, too much paint, too much dirt and too little taste, are the characteristics of the above pictures. I left hoping that he might see the folly of his way and take the Journal.

This completes my notes upon the Washington Galleries, which I have put through as Congress put their bills through at this season of the year—in a hurry—but unlike such bills, I have done full justice to all parties. An Amateur.

ON THE COLORING OF GLASS POSITIVES.

To the Editor of the Photographic Journal:

Glasgow, August 12, 1856.

Sir,—I was much surprised on learning from a correspondent in your last Number, that a patent had been taken out for the application of oil color to glass positives. Upon what claims the patantee has secured a privilege so extraordinary, I am at a loss to conceive: as to any originality in the idea, it would be absurb to suppose it had not suggested itself to many since the introduction of collodion positives, and oil painting is certainly no hocus-pocus or new-fangled trick to be bought or sold and practised *ad libitum*; it is in fact the legitimate walk of any artist, with ability and inclination to pursue it.

I was myself induced to make the trial nearly two years since and abandoned it, not from any dissatisfaction at the results, but upon consideration that, the picture being reversed and consequently imperfect, it was not worth the labor required to produce a satisfactory effect. Having, however, ultimately overcome this objection by obtaining my positive direct, I again turned my attention to it, and if you think a few hints upon the subject (which under the circumstances I conceive I have a perfect right to give) will be worth a place in your Journal, they are at your service.

In the first place, I get my positive direct from the camera by the following simple, and as I have found, effectual means. The principal feature is placing the prepared plate in the camera reversed, the picture being produced by the rays passing through the glass to the collodion surface; as the arrangement necessarily involves a difference in manipulatory details, I will proceed to describe them. The plate, when taken from the nitrate bath, must be carefully cleaned on the back from all traces of drains, or in fact of anything; the necessity of strict attention to this point must be obvious. It is then to be laid in the dark frame, collodion side uppermost, when a blackened glass of the same dimensions, with bits interposed at the corners, is placed over it to receive the pressure of the spring; this method is recommended for extemporaneous purposes only, as the object can be more conveniently accomplished by an arrangement in the back of the slide, which a very slight exercise of the mechanical faculty will suggest. With reference to focusing, the aberration caused by the refractive property of the glass may be met by focusing through a plate of the same thickness, or if your ground scum be of the proper thickness, the object is effected by simply reversing it. By following the above plan a clean picture, with the subject in its true position, is obtained, which, when varnished with amber, is ready for painting.

We now come to a point where there is no royal road to persue: patient labor and artistic skill are the requirements, and if such be brought to bear, very fine results, commensurate with the ability of the artist, may be produced. The photograph selected should be quite free from any tendency to fogginess in the shadows, as much of the beauty of the finished picture will depend upon the preservation of that rich depth and transparency a well-developed glass positive presents. As a rule, but little color should be used, that the delicate tones may not be lost. Some difficulty will probably at first be experienced in getting the color to work kindly on a smooth a surface; in this respect, a slight preparation of ox-gall passed over it, previous to commencing, will be of great assistance.

I am, Sir, yours obediently,

Antimonopolist.

Personal & Art Intelligence.

— As we know of no theme which should be of greater importance to the Photographer, than that upon which we touched in our last, we shall here resume the subject. Photography as an *Art* daily becomes more manifest, while as a *science* it loses none of its prestage or interest. It truly and beautifully embraces both. In both it is continually stretching forth its influences, and commanding the active exertion of the minds of philosophers and artists. By it, these two classes of workers in nature are brought more intimately together. The man of science has a never-ending source of beautiful experiments to occupy his attention, which leads him into a closer study of the beautiful in nature, than he would entertain by the mere series of chemical experiments which only develop some new discovery in the combination, or composition of the elements; or perhaps of some entirely new substance. While he has his favorite pleasure of watching the ever varying changes produced by light, heat, electricity and moisture, his source of pleasure is further enhanced by the degree of perfection he may attain in his sun-drawn pictures.

The Artist on the other hand, has more to occupy his mind in the study of the real effects of light and shade, as produced by Nature herself, and comparing them with his own preconceived opinions, and the productions of those who have ever stood foremost as the Great Masters of Art. He is enabled to correct what is wrong, and improve that which is right. He has a ready help in doubt and perplexities, while his labor is reduced one-half.

The Photographer therefore stands between the philosopher and the artist, equal to them in position, and should be in genius and ability. A cultivated mind is as necessary to him also as to the others; without it, as well as the natural ability to appreciate true art, he can never expect to attain that proficiency which alone can elevate him to the highest rank in the Art. Ten years ago, the country was over-run with *operators* in the daguerrean art, not one in fifty of whom were entitled even to the name of *Daguerreans.* Mere dabsters, capable of producing shadows only, they have been gradually diminishing and growing beautifully less for the last five years, and their places are becoming occupied by a superior class. This will continue until only men of genius will direct Photography. Every branch of the Art will undergo improvement upon improvement, until the great desideratum, *perfection,* is attained. Then genius alone will flourish; the cultivated mind alone preserve ascendancy; Photography will take its stand among the high places in Art, and the ephemeral attempts of dabsters will be looked upon with the disgust they merit.

Photography as an Art has heretofore been indebted entirely to science; but now science begins to experience the benefits of its grateful child. Our government has been slow in acknowledging its usefulness ; but the experiments of Lieutenant Gilmore at West Point, during the summer of 1855, have awakened it to a sense of its importance, and it has been adopted recently for scientific purposes into several departments, and scarcely an expedition is sent out for exploration or survey that is not accompanied by its photographer. In view of all the facts here presented, cannot those who at present stand at the head of the art, perceive the inevitable consequences that must result to them unless they take more active measures for self-improvement, than those only within the reach of individual exertion. Mere mechanical manipulation is not the only branch requiring improvement to maintain ascendancy in any business of life, and there is none that requires the cultivation of the mind more than photography. If this is not duly appreciated and properly attended to by those now engaged in the art, their sphere will be invaded by men intellectually capable of conducting it, as far above them as they now are above those who are daily abandoning it for want of skill and patronage, and who will ultimately supply their places. As much as we consider the Journals have done for photography in this country, and are destined still to effect, we must express the opinion that a well organized society could do more, and we shall not cease to urge its formation until the object is attained. There should be a Photographic Society in every city of the Union where there is more than one artist, and these should be auxilliary to a National Association located at some central point, easily accessible to all parts of the country. Here should be placed a permanent gallery of exhibition, and every means taken to make it attractive. When this is accomplished, we shall not have to look to Europe for all our improvements, and not till then. When shall we see the plan executed ?

— "An Artist" must excuse us for not inserting his communication. Both sides of the subject have already been fully discussed, and occupied as much space in our columns as we can afford to devote to it. We doubt not you are well posted up in the matter and speak knowingly, but we do not think it necessary, or that it would have any good effect, to pursue the subject further.

— We give place to the following communication with pleasure, as we ever regret to see persevering enterprise and deserving talent unsuccessful for want of encouragement, and that Mr. Ball is deserving none who know him, or have seen his pictures will deny:—

To the Editor of the Photographic and Fine Art Journal:

Mr. Editor,—Your correspondent, O. J. W., in writing you a description of the Photographic Galleries of Cincinnati, in your last number states that "Ball's Gallery is now struggling in its last agonies;" for the benefit of your numerous readers, I have the satisfaction of informing you that so far from this statement having its foundation in truth, that just the reverse is true. Ball's Gallery being in the very zenith of its prosperity, having been recently enlarged to double its former size and refitted in a style of elegance unsurpassed; its facilities for the dispatch of all kinds of work in the Photographic line, are of the most superior character.

Your correspondent has yet to learn an important fact, that the prosperity of an establishment is not attributable to chance or accident or any thing of that kind, but is the certain reward of enterprise, which an intelligent and appreciating community are always prompt in bestowing.

By inserting the above in your next number, you will oblige. Yours respectfully,

Cincinnati, Sept. 19, '56. T. C. Ball.

— Tatum's Patent Oil Ground Photographs.—This is an entirely new and useful application of the Photographic Art. The invention lays open another and wonderful field to the artist, well worthy of his careful study and attention.

It consists of rendering any canvass or other substance intended to be painted in oil, capable of receiving the Photographic impression with the same facility as paper; a process which has hitherto been deemed impossible, owing to the oily nature of the canvas which always has a tendency to resist the applications of the photographic chemicals which are necessarily combined with water. There have been impressions made upon canvas by first laying over a coating of albumen or glutinous matter, thereby forming a layer entirely over the oil, and the impression then made upon it. But when the oil is applied in painting the portrait, the whole will immediately crack off, thereby destroying it entirely ; of course this plan has been found quite impracticable.

By Tatum's patent oil ground, none of these objections can be raised, as the oil is rendered perfectly inert for the time being, and the chemicals used for the Photographic impression are applied with the same facility as upon paper; indeed with much less trouble, as all the large and cumbersome dishes are dispensed with, the canvass itself answering all the purposes of a gutta-percha dish.

After the impression is finished and carefully dried, the canvas can be restored to its original oily state, and rendered in truth, more susceptible of receiving the painting in oil than before, as it presents a more *velvety* surface after this treatment. The chemicals themselves are entirely removed from the surface, and the photographic impression has become part and parcel of the ground itself.

The patentee claims therefore that this is an entirely new and useful discovery—as it obviates the great and valid objection

hitherto made to these impressions with albumen and other kindred substances. He can with confidence recommend the process to all those who are desirous of attaining the newest and most valued improvements, feeling assured that his process will supercede all others.

The impressions on the canvas are made of course from negatives on glass, and it require only an ordinary quarter sized camera, and silver bath of sufficient dimensions, to produce one as large as may be desired.

The inventor is desirous of having all the Photographers throughout the United States avail themselves of this valuable discovery, and he has therefore empowered Mr. Burgess to act as his agent for the sale of room rights—also State, County and City rights, as well as to impart the details of the process to those who may purchase the privilege.

In reference to an advertisement inserted on our cover, those who are desirous of learning more of this new discovery, may do so by calling or addressing the patentee, at Mr. Burgess' room, No. 293 Broadway, New York.

— Mr. A. A. Turner has entered into co-partnership with Mr. J. A. Cutting, and they are now opening a Photographic Gallery in Boston, which promises to be the finest in the United States. The reception room is on the first floor and is to be furnished in the most refined and elegant style, while the operating rooms are to be replete with every convenience. A large amount of capital is to be invested, and those who know the gentlemen, will feel assured that taste will not be wanting in any department.

— We received a call during last week from Mr. Cutting, when he informed us that he had obtained a re-issue of his *balsam* patent. He does not deny that he was conversant with the facts that balsam had been used in various ways for cementing glass, and even in putting up daguerreotypes, previous to his using it for *Ambrotypes*, and confesses that these facts suggested the application; but he contends that having been the first thus to use it, he is justly entitled to the protection of the patent laws in its use. This is therefore the point at issue, a point which can be established only by a jury. It will be remembered that when the subject of Mr. Cutting's patent first came before us, that we repudiated them, with the exception of the use of balsam, although we confessed that we could not see how this application of an old principle could grant a man exclusive right, and that it was not until we were informed that *balsam* had been positively used as early as 1849, to cement the two glasses of the stereoscope picture, that we resisted this claim also. We have not the slightest doubt that Mr. Cutting is perfectly sincere in his belief of right, but we are also convinced that he will liberally accord to us equal sincerity in our opinions and reasons for contending the point with him. If upon fair trial any twelve men will extend to him the exclusive right in this matter, we shall not gainsay their verdict but submit with the best grace possible; and the sooner the decision is made the better it will be for all parties. If our views of the case (already expressed and not necessary to repeat here), are pronounced erroneous by a jury of twelve intelligent men, Mr. Cutting will have as warm a support from us as he now has opposition. He complains that we have opposed him without due consideration, and have made our statements too general, so that he has been prevented from considering them of sufficient weight to deserve an answer from him. In this we think he is mistaken. We have denied his right to the patent for the *balsam*, because it had been previously used (in 1849 and '50), precisely in similar manner for securing daguerreotypes and stereoscopic pictures (as before stated). He acknowledges the daguerreotype but denies the other. Now if it can be proved that our informants on these points have mistated the case to us, then we shall have to succumb, and shall do so without reserve; but until then we doubt not all will consider our views perfectly legitimate. One thing we cheerfully grant to Mr. Cutting. The present prosperity of the Photographic Art certainly owes more to him than any other individual connected with it. Every move he has made in it has given it an onward impetus. It matters not that his aim has been profit—that is the purpose of *all* now engaged in it—for he has avoided the beaten track and struck out a new one, that has ultimately lead to an exciting contention beneficial to the art itself. Mr. Cutting denies that he has ever made an extravagant or "extortionate" demand for a patent right, but on the contrary has asked according to the means of the applicant, and the nature of the county for which the patent was demanded—nor has any one in his employ been permitted to make these unreasonable demands. Mr. Cutting does not pretend to answer for any action taken by the company who purchased the patent, and in the management of which he had no control. These statements we make in justice to Mr. Cutting, not because our opinion in regard to the validity of his claim is changed in the least—that can only be effected by a decision at law impartially rendered, and that change can only be as to the law, not justice of the case; for if it can be truly proved that the idea originated in the sealing of daguerreotypes and stereoscopic pictures, then justice will declare against, though law may be with him. To the many who have made inquiries in regard to the suits supposed to have been brought recently against infringements of the patents, we have to answer that no such suits have been instituted. The suits in question are to test the right of the patentee to the use of the word "*Ambrotype*," as applied indiscriminately to positives on glass, *as a trade mark*. None of these suits have yet been brought to issue. They came up in court on the 1st Tuesday in September, but were postponed, we understand, on application of the plaintiff (Mr. Tomlinson), for six months. We shall report the trial when it comes off.

— The opening of the *Fair of the American Institute*, which took place on the 25th ult., has drawn quite a number of photographers to the city, and we expect to see the finest display of photographic pictures ever exhibited in New York. Hesler, of Chicago, Faris of Cincinnati, Faris of Wheeling, Perkins of Augusta, Burns of Mobile, Dobyns of New Orleans, Woodbridge of Columbus, Ga., Turner of Springfield, Ohio, and Moulthop of New Haven, have visited us during the past week. Of this latter gentleman we have had heretofore no opportunity to speak, his retiring disposition being such that we have never yet seen any of the results of his manipulations. We have, however, seen some of his pencil sketches, and no one capable of the degree of excellence to which he has attained as an artist, can be otherwise than a skillful photographer, and we are further convinced of this from the fact that he has taken and sold over fifty thousand portraits during the past year.

— The *official Journal* of the Massachusetts Charitable Mechanic Association Fair just closed at Boston, thus speaks of the Photographic pictures, exhibited by Mr. Hesler, of Chicago:

"We advise any of our readers, whether ladies or gentlemen, desiring to witness this art brought to perfection, to visit Section Five in Quincy Hall. There are many fine specimens contributed by well-known and justly famed artists of this city; but we desire to call attention particularly to that department appropriated to Hesler's pictures. We have never seen their equal. The figures are grouped in the most artistical manner, so different from pictures of this kind generally. Very frequently we see portraits of persons who are in reality handsome, so distorted by being placed in some position utterly at variance with their usual habits, that, transferred to the plate of the daguerreotypist, they become actually homely. No one need fear this from sitting to the artist above named. His positions are eminently graceful and natural; and once again we recommend you to give some time to Hesler's Photographic Gallery. Would we could write "Boston" after the name of this artist! but justice compels us to inform you that his local habitation is No. 22 Metropolitan Buildings, Lasalle Street, Chicago, Ill.

— We have just re-published, in pamphlet form, *Sutton's Calotype Process*, *Hennah's Collodion Process*, and *Monckhoven's Collodion Process*; all very useful books to the photographer. Price 50 cents each; or the three to one address for $1.

— We wish *all delinquent subscribers* to understand that the names of those in arrears on the 25th of December prox., will be erased from our books and their Journal stopped.

THE SOLDIERS' SON.

Negative by Whipple & Black, from a Statuette in the New York Crystal Palace.

THE STEREOSCOPE
Its History, Theory, and Construction.*

BY SIR DAVID BREWSTER.

CHAPTER VII.

DESCRIPTION OF DIFFERENT STEREOSCOPES

ALTHOUGH the lenticular stereoscope has every advantage that such an instrument can possess, whether it is wanted for experiments on binocular vision—for assisting the artist by the reproduction of objects in relief, or for the purposes of amusement and instruction, yet there are other forms of it which have particular properties, and which may be constructed without the aid of the optician, and of materials within the reach of the humblest inquires. The first of these is—

1. *The Tubular Reflecting Stereoscope.*

In this form of the instrument, shewn in Fig. 28, the pictures are seen by reflexion from two specula or prisms placed at an angle of 90°, as in Mr. Wheatstone's instrument. In other respects the two instruments are essentially different.

In Mr. Wheatstone's stereoscopes he employs two mirrors, each *four inches* square—that is, he employs *thirty-two* square inches of reflecting surface, and is therefore under the necessity of employing glass mirrors, and making a clumsy, unmanageable, and unscientific instrument, with all the imperfections which we have pointed out in a preceding chapter. It is not easy to understand why mirrors of such a size should have been adopted. The reason of their being made of common looking-glass is, that metallic or prismatic reflectors of such a size would have been extremely expensive.

It is obvious, however, from the slightest consideration, that reflectors of such a size are wholly unnecessary, and that *one-square* inch of reflecting surface, in place of *thirty-two*, is quite sufficient for uniting the binocular pictures. We can, therefore, at a price as low as that of the 4-inch glass reflectors, use mirrors of speculum metal, steel, or even silver, or rctangular glass prisms, in which the images are obtained by total reflexion. In this way the stereoscope becomes a real optical instrument, in which the reflexion is made from surfaces single and perfectly

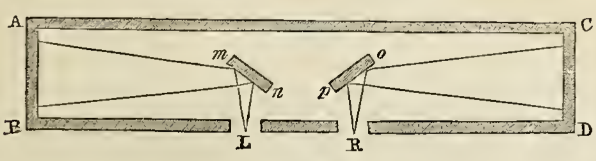

Fig. 28.

flat, as in the second reflexion of the Newtonian telescope and the microscope of Amici, in which pieces of looking-glass were never used. By thus diminishing the reflectors, we obtain a portable tubular instrument occupying nearly as little room as the lenticular stereoscope, as will be seen from Fig. 28, where A B C D is a tube whose diameter is equal to the largest size of one of the binocular pictures which we propose to use, the left-eye picture being placed at C D, and the right-eye one at A B. If they are transparent, they will be illuminated through paper or ground glass, and if opaque, through openings in the tube. The image of A B, reflected to the left eye L from the small mirror *m n*, and that of C D to the right eye R from the mirror *o p*, will be united exactly as in Mr. Wheatstone's instrument already described. The distance of the two ends, *n, p*, of the mirrors should be a little greater than the smallest distance between the two eyes. If we wish to magnify the picture, we may use two lenses, or substitute for the reflectors a totally reflecting glass prism, in which one or two of its surfaces are made convex.†

2. *The Single Reflecting Stereoscope.*

This very simple instrument, which however, answers only for symmetrical figures, such as those shewn at A and B, which must be either two right-eye or two left-eye pictures, is shewn in Fig. 29. A single reflector, MN, which may be either a piece of glass, or

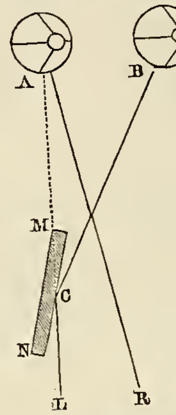

Fig. 29.

a small metallic speculum, or a rectangular prism, is placed at M N. If we look into it with the left eye L, we see, by reflexion from its surface at C, a reverted image, or a right-eye picture of the left-eye picture B, which, when seen in the direction L C A, and combined with the figure A, seen directly with the right eye R, produces a *raised* cone; but if we turn the reflector L round, so that the right eye may look into it, and combine a reverted image of A, with the figure B seen directly with the left eye L, we shall see a *hollow* cone. As BC+CL is greater than R A, the reflected image will be slightly less in size than the image seen directly, but the difference is not such as to produce any perceptible effect upon the appearance of the hollow or the raised cone. By bringing the picture viewed by reflexion a little nearer the reflector MN, the two pictures may be made to have the same apparent magnitude.

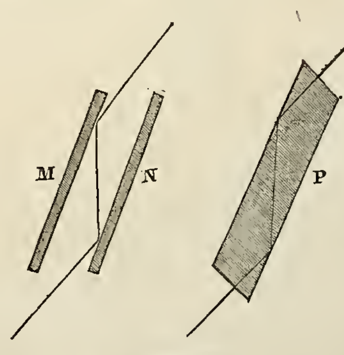

Fig. 30.

If we substitute for the single reflector M N, two reflectors such as are shewn at M, N, Fig. 30, or a prism P, which gives internal reflexions, we shall have a general stereoscope, which answers for landscapes and portraits.

The reflectors M, N, or P may be fitted up in a conical tube, which has an elliptical section to accommodate two figures at its farther end, the major axis of the ellipse being parallel to the line joining the two eyes.

* Continued from p. 309.

† We may use also the lens prism, which I proposed many years ago in the *Edinburgh Philosophical Journal.*

3. *The Double Reflecting Stereoscope.*

This instrument differs from the preceding in having a single reflector, M N, M′ N′, for each eye, as shewn in Fig. 31, and the

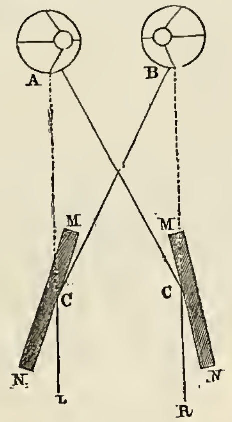

Fig. 31.

effect of this is to exhibit, *at the same time, the raised and the hollow cone.* The image of B, seen by reflexion from M N at the point C, is combined with the picture of A, seen directly by the *right* eye R, and forms a *hollow* cone; while the image of A, seen by reflexion from M′ N′ at the point C′, is combined with the picture B, seen directly by the left eye L, and forms a *raised* cone.

Another form of the double reflecting stereoscope is shewn in Fig. 32, which differs from that shewn in Fig. 31 in the position of the two reflectors and of the figures to be united. The reflecting faces of the mirrors are turned outwards, their distance being less than the distance between the eyes, and the effect of this is to exhibit at the same time the *raised* and the *hollow* cone, the hollow cone being now on the right-hand side.

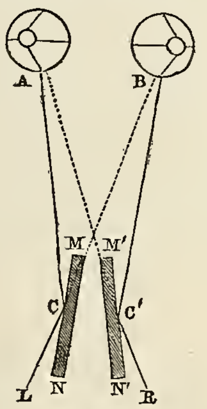

Fig. 32.

If in place of two right or two left eye pictures, as shewn in Figs. 29, 31, and 32, we use one right eye and one left eye picture, and combine the reflected image of the one with the reflected image of the other, we shall have a *raised* cone with the stereoscope, shewn in Fig. 31, and a *hollow* cone with the one in Fig. 32.

The double reflecting stereoscope, in both its forms, is a general instrument for portraits and landscapes, and thus possesses properties peculiar to itself.

The reflectors may be glass or metallic specula, or total reflexion prisms.

4. *The Total Reflexion Stereoscope.*

This form of the stereoscope is a very interesting one, and possesses valuable properties. It requires only a small prism and *one* diagram, or picture of the solid, as seen by one eye; the other diagram, or picture which is to be combined with it, being created by total reflexion from the base of the prism. This instrument is shewn in Fig. 33, where D, is the picture of a cone as seen by the left eye L, and A B C a prism, whose base B C is so large, that when the eye is placed close to it, it may see, by reflexion, the whole of the diagram D. The angles A B C, A C B must be equal, but may be of any magnitude. Great accura-

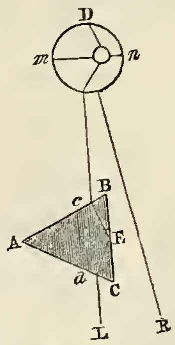

Fig. 33.

cy in the eqality of the angles is not uecessary; and a prism constructed, by a lapidary, out of a fragment of thick plate-glass, the face B C being oue of the surfaces of the plate, will answer the purpose. When the prism is placed at *a*, Fig. 34, at one end of a conical tube L D, and the diagram D at the other end, in a cap, which can be turned round so as to have the line *m n*, Fig. 33, which passes through the centre of the base and summit of the cone parallel to the line joining the two eyes, the instrument is ready for use. The observer places his left eye at L, and views with it the picture D, as seen by total reflexion from the base of the prism, Figs. 33 and 35, while with his right eye R, Fig. 33, he views the real picture directly. The first of these pictures being the reverse of the second D, like all pictures formed by one reflexion, we thus combine two dissimilar

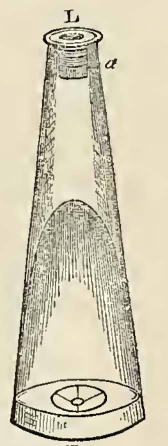

Fig. 34.

pictures into a *raised* cone, as in the figure, or into a *hollow* one if the picture at D is turned round 180°. If we place the images of two diagrams, one like one of those at A, Fig. 31, and the other like the one at B, vertically above one another, we shall then see, at the same time, the *raised* and the *hollow* cone, as produced in the lenticular stereoscope by the three diagrams, two like those in Fig. 31, and the third like the one at A. When the prism is good, the dissimilar image, produced by the two refractions at B and C, and the one reflexion at E, is, of course, more accurate than if it had been drawn by the most skillful artist; and therefore this form of the stereoscope has in this respect an advantage over every other in which two dissimilar figures, executed by art, are necessary. In consequence of the length of the reflected pencil D B + B E + E C + C L being a little greater than the direct pencil rays D R, the two images combined have not exactly the same apparent magnitude; but the difference is not perceptible to the eye, and a remedy could easily be provided were it required.

If the conical tube L D is held in the left hand, the left eye must be used, and if in the right hand the right eye must be used, so that the hand may not obstruct the direct vision of the drawing by the eye which does not look through the prism. The cone L D must be turned round slightly in the hand till the line *m n* joining the centre and apex of the figure is parallel to the line joining the two eyes. The same line must be parallel to the plane of reflexion from the prism and the drawing.

It is scarcely necessary to state that this stereoscope is applicable only to those diagrams and forms where the one image is the reflected picture of the other.

If we wish to make a microscopic stereoscope of this form, or to magnify the drawings, we have only to cement plano-convex lenses, of the requisite focal length, upon the faces A B, A C of the prism, or, what is simpler still, to use a section of a deeply convex lens A B C, Fig. 35, and apply the other half of the lens to

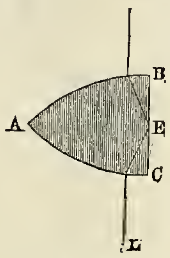

Fig 35.

the right eye, the face B C having been previously ground flat and polished for the prismatic lens. By using a lens of larger focus for the right eye, we may correct, if required, the imperfection arising from the difference of paths in the reflected and direct pencils. This difference, though trivial, might be corrected, if thought necessary, by applying to the right eye the central portion of the same lens whose margin is used for the prism.

If we take the drawing of a six-sided pyramid as seen by the right eye, as shewn in Fig. 36, and place it in the total-reflexion stereoscope at D, Fig. 33, so that the line M N coincides with *m n*, and is parallel to the line joining the eyes of the observer, we shall perceive a perfect raised pyramid of a given height, the reflected image of C D, Fig. 36, being combined with A F, seen directly. If we now turn the figure round 30°, C D will come into the position A D, and unite with A B, and we shall still perceive a raised pyramid, with less height and less symmetry. If we turn it round 30° more, C D will be combined with B C, and

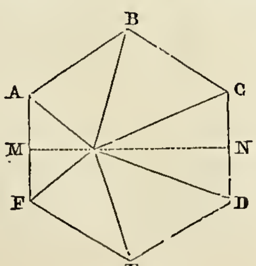

Fig. 36.

we shall still perceived a raised pyramid with still less height and still less symmetry. When the figure is turned round other 30 degrees, or 90 degrees from its first position, C D will coincide with C D seen directly, and the combined figures will be perfectly flat. If we continue the rotation through other 30°, C D will coincide with D E, and a slightly hollow, but not very symmetrical figure, will be seen. A rotation of other 30° will bring C D into coalesence with E F, and we shall see a still more hollow and more symmetrical pyramid. A further rotation of 30°, making 180° from the commencement, will bring C D into union with A F; and we shall have a perfectly symmetrical hollow pyramid of still greater depth, and the exact counterpart of the raised pyramid which was seen before the rotation of the figure commenced. If the pyramid had been square, the *raised* would have passed into the *hollow* pyramid by rotations of 45° each. If it had been rectangular, the change would have been effected by rotations of 90°. If the space between the two circular sections of the cone in Fig. 31 had been uniformly shaded, or if lines had been drawn from every degree of the one circle to every corresponding degree in the other, in place of from every 90th degree, as in the Figure, the raised cone would have gradually diminished in height, by the rotation of the figure, till it became flat, after a rotation of 90°; and by continuing the rotation it would have become hollow, and gradually reached its maximum depth after a revolution of 180°.

5. *The Single-Prism Stereoscope.*

Although the idea of uniting the binocular pictures by a single prism applied to one eye, and refracting one of the pictures so as to place it upon the other seen directly by the other eye, or by a prism applied to each eye, could hardly have escaped the notice of any person studying the subject, yet the experiment was, so far as I know, first made and published by myself. I found two prisms quite unnecessary, and therefore abandoned the use of them, for reasons which will be readily appreciated. This simple instrument is shewn in Fig. 37, where A, B are the dissimilar pictures, and P a prism with such a refracting angle as is sufficient to lay the image of A upon B, as seen by the right eye. If we place a *second* prism before the eye R, we require it only to have half the refracting angle of the prism P, because each prism now refracts the picture opposite to it only half way between A and B, where they are united. This,

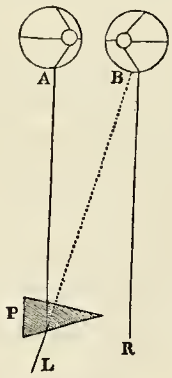

Fig. 37.

at first sight, appears to be an advantage, for as there must always be a certain degree of color produced by a single prism, the use of two prisms, with half the refracting angle, might be supposed to reduce the color one-half. But while the color produced by each prism is thus reduced, the color over the whole picture is the same. Each luminous edge with two prisms has both red and blue tints, whereas with one prism each luminous edge has only one color, either red or blue. If the picture is very luminous these colors will be seen, but in many of the finest opaque pictures it is hardly visible. In order, however, to diminish it, the prism should be made of glass with the lowest dispersive power, or with rock crystal. A single plane surface, ground and polished by a lapidary, upon the edge of a piece of plate glass, a little larger than the pupil of the eye, will give a prism sufficient for every ordinary purpose. Any person may make one in a few minutes for himself, by placing a little bit of good window glass upon another piece inclined to it at the proper angle, and inserting in the angle a drop of fluid. Such a prism will scarcely produce any perceptible color.

If a single-prism reflector is to be made perfect, we have only to make it achromatic, which could be done *extempore*, by correcting the color of the fluid prism by another fluid prism of different refractive and dispersive power.

With a good achromatic prism the single prism stereoscope is a very fine instrument; and no advantage of any value could be gained by using *two acromatic prisms.* In the article on New

Stereoscopes, published in the Transactions of the Royal Society of Arts for 1849, and in the Philosophical Magazine for 1852, I have stated in a note that *I believed* that Mr. Wheatstone had used *two acromatic prisms*. This, however, was a mistake, as already explained,* for such an instrument was never made, and has never been named in any work previous to 1849, when it was mentioned by myself in the note above referred to.

If we make a double prism, or join two, as shewn at P, P′ in

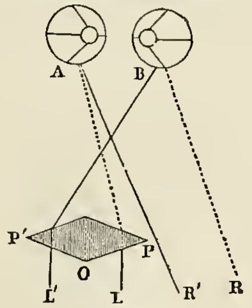

Fig. 38.

Fig. 38, and apply it to two dissimilar figures A, B, one of which is the reflected image of the other, so that with the left eye L and the prism P we place the refracted image of A upon B, as seen by the right eye R, we shall see a *raised* cone, and if with the prism P′ we place the image of B upon A we shall see a *hollow* cone. If we place the left eye L at O, behind the common base of the prism, we shall see with one-half of the pupil the *hollow* cone and with the other half the *raised* cone.

6. *The Opera-Glass Stereoscope.*

As the eyes themselves form a stereoscope to those who have the power of quickly converging their axes to points nearer than the object which they contemplate, it might have been expected that the first attempt to make a stereoscope for those who do not possess such a power, would have been to supply them with auxiliary eyeballs capable of combining binocular pictures of different sizes at different distances from the eye. This, however, has not been the case, and the stereoscope for this purpose, which we are about to describe, is one of the latest of its forms.

In Fig. 39, M N is a small inverting telescope, consisting of

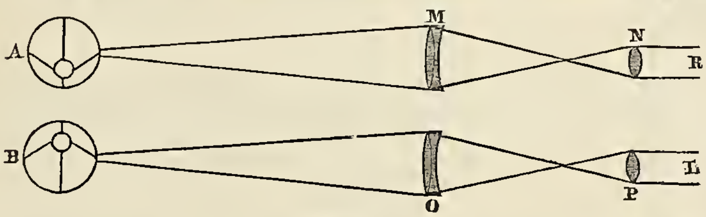

Fig. 39.

two convex lenses M, N, placed at the sum of their focal distances, and O P another of the same kind. When the two eyes, R, L, look through the two telescopes directly at the dissimilar pictures A, B, they will see them with perfect distinctness; but, by the slightest inclination of the axes of the telescopes, the two images can be combined, and the stereoscopic effect immediately produced. With the dissimilar pictures in the diagram a *hollow* cone is produced; but if we look at B with the telescope M′ N′, as in Fig. 40, and at A′ with O′ P′, a *raised* cone will be seen. With the usual binocular slides containing portraits or landscapes, the pictures are seen in relief by combining the right-eye one with the left-eye one.

The instrument now described is nothing more than a double opera-glass, which itself forms a good stereoscope. Owing, however, to the use of a concave eye-glass, the field of view is very small, and therefore a convex glass, which gives a larger field, is greatly to be preferred.

* See Chap. i. p. 267.

The little telescopes, M N, O P, may be made one and a half or even one inch long, and fitted up, either at a fixed or with a variable inclination, in a pyramidal box, like the lenticular stereoscope, and made equally portable. One of these instruments was made for me some years ago by Messrs. Horne and Thornthwaite, and I have described it in the *North British Review*† as having the properties of a *Binocular Cameoscope*, and of what has been absurdly called a *Pseudoscope*, seeing that

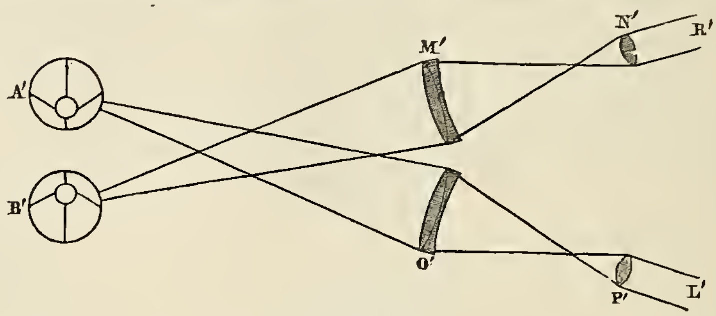

Fig. 40.

every inverting eye-piece and every stereoscope is entitled to the very same name.

The little telescope may be made of one piece of glass, *convex* at each end, or *concave* at the eye-end if a small field is not objectionable,—the length of the piece of glass, in the *first* case, being equal to the *sum*, and, in the *second* case, to the *difference* of the focal lengths of the virtual lenses at each end.‡

7. *The Eye-Glass Stereoscope.*

As it is impossible to obtain, by the ocular stereoscope, pictures in relief from the beautiful binocular slides which are made in every part of the world for the lenticular stereoscope, it is very desirable to have a portable stereoscope which can be carried safely in our purse, for the purpose of examining stereoscopally all such binocular pictures.

If placed together with their plane sides in contact, a plano-convex lens, A B, and a plano-concave one, C D, of the same glass and the same focal length, will resemble a thick watch-glass, and on looking through them, we shall see objects of their natural size and in their proper place; but if we slip the concave lens, C D, to a side, as shown in Fig. 41, we merely displace the image of the object which we view, and the displacement increases till the centre of the concave lens comes to the margin of the convex one. We thus obtain a variable prism, by means of which we can, with the left eye, displace one of the binocular pictures, and lay it upon the other, as seen by the right eye. We may use semi-lenses or quarters of lenses, and we may make them achromatic or nearly so if we desire it. Double convex and double concave lenses may also be used, and the motion of the concave one regulated by a screw. In one which I constantly use, the concave lens slides in a groove over a convex quarter lens.

By employing two of these variable prisms, we have an

Fig. 41.

Universal Stereoscope for uniting pictures of various sizes and at various distances from each other, and the prisms may be placed in a pyramidal box, like the lenticular stereoscope.

† For 1852, vol. xvii. p. 200.

‡ These solid telescopes may be made achromatic by cementing concave lenses of flint glass upon each end, or of crown glass if they are made of flint glass.

8. *The Reading-Glass Stereoscope.*

If we take a reading-glass whose diameter is not less than two inches and three-quarters, and look through it with both eyes at a binocular picture in which the right-eye view is on the left hand, and the left-eye view is on the right hand, as in the ocular stereoscope, we shall see each picture doubled, and the degree of separation is proportional to the distance of the picture from the eye. If the distance of the binocular pictures from each other is small, the two middle images of the four will be united when their distance from the lens is not very much greater than its focal length. With a reading-glass $4\frac{1}{2}$ inches in diameter, with a focal length of two feet, binocular pictures, in which the distance of similar parts is *nine* inches, are united without any exertion of the eyes at the distance of eight feet. With the same reading-glass, binocular pictures at the usual distance of $2\frac{1}{2}$ inches, will be united at the distance of $2\frac{1}{4}$ or even $2\frac{1}{2}$ feet. If we advance the reading-glass when the distance is 2 or 3 feet, the picture in relief will be magnified, but, though the observer may not notice it, the separated images are now kept united by a slight convergency of the optic axes. Although the pictures are placed so far beyond the anterior focus of the lens, they are exceedingly distinct. The distinctness of vision is sufficient, at least to long-sighted eyes, when the pictures are placed within 16 or 18 inches of the observer, that is, 6 or 8 inches nearer the eye than the anterior focus of the lens. In this case we can maintain the union of the pictures only when we begin to view them at a distance of $2\frac{1}{2}$ or 3 feet, and then gradually advance the lens within 16 or 18 inches of the pictures. At considerable distances, the pictures are most magnified by advancing the lens while the head of the observer is stationary.

9. *The Camera Stereoscope.*

The object of this instrument is to unite the transient pictures of groups of persons or landscapes, as delineated in two dissimilar pictures, on the ground glass of a binocular camera. If we attach to the back of the camera a lenticular stereoscope, so that the two pictures on the ground glass occupy the same place as its usual binocular slides, we shall see the group of figures in relief under every change of attitude, position and expression. The two pictures may be formed in the air, or, more curiously still, upon a wreath of smoke. As the figures are necessarily inverted in the camera, they will remain inverted by the lenticular and every other instrument but the opera-glass stereoscope, which inverts the object. By applying it therefore to the camera, we obtain an instrument by which the photographic artist can make experiments, and try the effect which will be produced by his pictures before he takes them. He can thus select the best forms of groups of persons and of landscapes, and thus produce works of great interest and value.

10. *The Chromatic Stereoscope.*

The chromatic stereoscope is a form of the instrument in which relief or apparent solidity is given to a single figure with different colors delineated upon a plane surface.

If we look with both eyes through a lens L L, Fig. 42, about

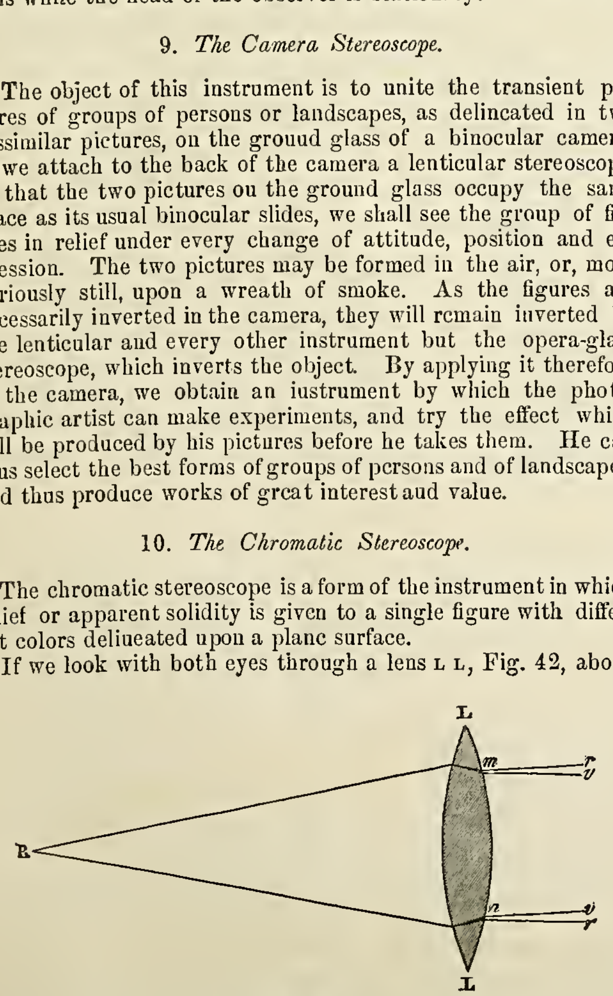

Fig. 42.

$2\frac{1}{2}$ inches in diameter or upwards, at any object having colors of different degrees of refrangibility, such as the colored boundary lines on a map, a red rose among green leaves and on a blue background, or any scarlet object whatever upon a violet ground, or in general any two simple colors not of the same degree of refrangibility, *the differently colored parts of the object will appear at different distances from the observer.*

Let us suppose the rays to be *red* and *violet*, those which differ most in refrangibility. If the red rays radiate from the anterior focus R, or red rays of the lens L L, they will emerge parallel, and enter the eye at *m*; but the violet rays radiating from the same focus, being more refrangible, will emerge in a state of convergence, as shewn at $m\,v$, $n\,v$, the red rays being $m\,r$, $n\,r$. The part of the object, therefore, from which the red rays come, will appear nearer to the observer than the parts from which the violet rays come, and if there are other colors or rays of intermediate refrangibilities, they will appear to come from intermediate distances.

If we place a small *red* and *violet* disc, like the smallest wafer, beside one another, so that the line joining their centres is perpendicular to the line joining the eyes, and suppose that rays from both enter the eyes with their optical axes parallel, it is obvious that the distance between the violet images on each retina will be *less* than the distance between the *red* images, and consequently the eyes will require to converge their axes to a *nearer* point in order to unite the violet images. The red images will therefore appear at this nearer point of convergence, just as, in the lenticular stereoscope, the more distant pair of points in the dissimilar images appear when united nearer to the eye. By the two eyes alone, therefore, we obtain a certain, though a small degree of relief from colors. With the lens, L L, however, the effect is greatly increased, and we have the *sum* of the *two* effects.

From these observations, it is manifest that the reverse effect must be produced by a concave lens, or by the common stereoscope, when *two* colored objects are employed or united. The *blue* part of the object will be seen *nearer* the observer, and the red part of it more *remote.* It is, however, a curious fact, and one which appeared difficult to explain, that in the stereoscope the color-relief was not brought out as might have been expected. Sometimes the red was nearest the eye, and sometimes the blue, and sometimes the object appeared without any relief. The cause of this is, that the color-relief given by the common stereoscope was the opposite of that given by the eye, and it was only the *difference* of these effects that ought to have been observed; and though the influence of the eyes was an inferior one, it often acted alone, and sometimes ceased to act at all, in virtue of that property of vision by which we see only with one eye when we are looking with two.

In the chromatic stereoscope, Fig. 42, the intermediate part $m\,n$ of the lens is of no use, so that out of the margin of a lens upwards of $2\frac{1}{2}$ inches in diameter, we may cut a dozen of portions capable of making as many instruments. These portions, however, a little larger only than the pupil of the eye, must be placed in the same position as in Fig. 42.

All the effects which we have described are greatly increased by using lenses of highly-dispersing flint glass, oil of cassia, and other fluids of a great dispersive power, and avoiding the use of compound colors in the objects placed in the stereoscope.

It is an obvious result of these observations, that in painting, and in colored decorations of all kinds, the *red* or less refrangible colours should be given to the prominent parts of the object to be represented, and the *blue* or more refrangible colors to the background and the parts of the objects that are to retire from the eye.

11. *The Microscope Stereoscope.*

The lenticular form of the stereoscope is admirably fitted for its application to small and microscopic objects. The first instruments of this kind were constructed by myself with quarter-inch lenses, and were 3 inches long and only 1 and $1\frac{1}{2}$ deep.* They may be carried in the pocket, and exhibit all the properties of the instrument to the greatest advantage. The mode of

* *Phil. Mag.*, Jan. 1852, vol. iii. p. 19.

constructing and nsing the instrument is precisely the same as in the commou stereoscope; but in taking the dissimilar pictures, we mnst use either a small binocular camera, which will give considerably magnified representations of the objects, or we must procure them from the compound microscope. The pictures may be obtained with a small single camera, by first taking one picture, and then shifting the object in the focus of the lens, through a space corresponding with the binocular angle. To find this space, which we may call x, made d the distance of the object from the lens, n the number of times it is to be magnified, or the distance of the image behiud the leus, and D the distance of the eyes; then we shall have

$$n\,d : d = \text{D} : x, \text{ and } x = \frac{\text{D}}{n}$$

that is, the space is equal to the distance between the eyes divided by the magnifying power.

With the binocular microscope of Professor Riddell,* and the same instrument as improved by M. Nachet, binocular pictnres are obtained directly by having them drawn, as Professor Riddell suggests, by the camera lucida, bnt it wonld be preferable to take them photographically.

Portraits for lockets or rings might be put into a very small stereoscope, by folding the one lens back upon the other.

CHAPTER VIII.

METHOD OF TAKING PICTURES FOR THE STEREOSCOPE.

However perfect be the stereoscope which we employ, the effect which it produces depends upon the accuracy with which the binocular pictures are prepared. The pictures required for the stereoscope may be arranged in four classes:—

1. The representations of geometrical solids as seen with two eyes.
2. Portraits, or groups of portraits, taken from living persons or animals.
3. Laudscapes, buildings, and machines or instruments.
4. Solids of all kinds, the productions of nature or of art.

Geometrical Solids.

Representations of geometrical solids, were, as we have already seeu, the only objects which for many years were employed in the reflecting stereoscope. The figures thns nsed are so well known that it is unnecessary to devote much space to their consideration. For ordinary purposes they may be drawn by the hand, and composed of sqnares, rectangles, and circles, representing quadrangular pyramids, trnncated, or terminating in a point, cones, pyramids with polygonical bases, or more complex forms in which raised pyramids or cones rise out of quadrangular or conical hollows. All these figures may be drawn by the hand, and will produce solid forms sufficiently striking to illustrate the properties of the stereoscope, though not accurate representations of any actual solid seen by binocular vision.

If one of the binocular pictures is not equal to the other in its base or summit, and if the lines of the one are made crooked, it is curious to observe how the appearauce of the resultiug solid is still maintained and varied.

The following method of drawing upon a plane the dissimilar representations of solids, will give results in the stereoscope that are perfectly correct:—

Let, L, R, Fig. 43, be the left and right eye, and A the middle point between them. Let M N be the plane on which an object or solid whose height is C B is to be drawn. Through B draw L B, meeting M N in c; then if the object is a solid, with its apex at B, cc will be the distance of its apex from the centre C of its base, as seen by the left eye. When seen by the right eye R, cc' will be its distance, c' lying on the left side of C. Heuce if the figure is a cone, the dissimilar pictures of it will be two circles, in one of which its apex is placed at the distance cc from its centre, and in the other at the diztance cc' on the other side of the centre. When these two plane fignres are placed in the stereoscope, they will, when combined, represent a raised cone when the points c, c' are nearer one another than the centres of the circles representing the cone's base, and a *hollow* cone when the figures are interchanged.

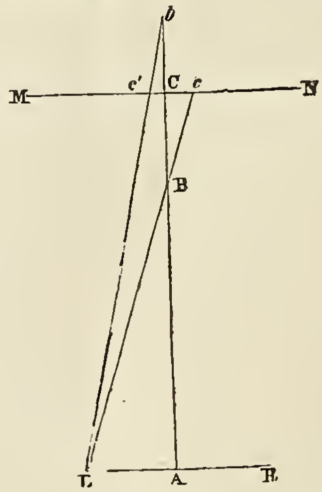

Fig. 43.

If we call E the distance between the two eyes, and h the height of the solid, we shall have $\text{A B} : h = \frac{\text{E}}{2} : cc$, and $cc = \frac{h\text{E}}{2\text{AB}}$, or $\frac{5h}{4\text{AB}}$, which will give us the resnlts in the following table, E being $2\frac{1}{2}$, and A C 8 inches:—

Height of object. B C=h	A B=A C—h	C c Inches.
1	7	0·179
2	6	0·4166
3	5	0 75
4	4	1·25
5	3	2·083
6	2	3·75
7	1	8·75
8	0	Infinite.

If we now converge the optic axes to a point b, and wish to ascertain the value of cc, which will give different *depths*, d of the *hollow* solids corresponding to different values of C b, we shall have $\text{A}\,b : \frac{\text{E}}{2} = d : cc'$, and $cc' = \frac{d\ \text{E}}{2\text{AB}}$, which, making A C=8 inches, as before, will give the following results:—

Depth. C b=d	A b=A C—a	C c' Inches.
1	9	0·139
2	10	0·25
3	11	0·34
4	12	0·4166
5	13	0·48
6	14	0 535
7	15	0·58
8	16	0 625
9	17	0·663
10	18	0.696
11	19	0·723
12	20	0·75

The values of h and d when cc, cc' are known, will be found from the formulæ $h = \frac{2\text{AB}\cdot cc}{\text{E}}$ and $d = \frac{2\text{AB}\cdot cc'}{\text{E}}$. As cc is always equal to cc' in each pair of figures or dissimilar pictures, the depth of the *hollow* cone will always appear much greater than the height of the raised one. Wheu $cc = cc' = 0{\cdot}75$, $h{:}d = 3{:}12$. When $cc = cc' = 0{\cdot}4166$, $h : d = 2 : 4$, and when $cc = cc' = 0{\cdot}139$, $h : d = 0{\cdot}8 : 1{\cdot}0$.

American Journal of Science, 1852, vol. xv. p. 68.

When the solids of which we wish to have binocular pictures are symmetrical, the one picture is the reflected image of the other, or its reverse, so that when we have drawn the solid as seen by one eye, we may obtain the other by copying its reflected image, or by simply taking a copy of it as seen through the paper.

When the geometrical solids are not symmetrical, their dissimilar pictures must be taken photographically from models, in the same manner as the dissimilar pictures of other solids.

Portraits of Living Animals or Persons.

Although it is possible for a clever artist to take two portraits, the one as seen by his right, and the other as seen by his left eye, yet, owing to the impossibility of fixing the sitter, it would be a very difficult task. A bust or statue would be more easily taken by fixing two apertures $2\frac{1}{2}$ inches distant, as the two points of sight, but even in this case the result would be imperfect. The photographic camera is the only means by which living persons and statues can be represented by means of two plane pictures to be combined by the stereoscope; and but for the art of photography, this instrument would have had a very limited application.

It is generally supposed that photographic pictures, whether in Daguerreotype or Talbotype, are accurate representations of the human face and form, when the sitter sits steadily, and the artist knows the resources of his art. *Quis solem esse falsum dicere audeat?* says the photographer, in rapture with his art. *Solem esse falsum dicere audeo*, replies the man of science, in reference to the hideous representations of humanity which proceed from the studio of the photographer. The sun never errs in the part which he has to perform. The sitter may sometimes contribute his share to the hideousness of his portrait by involuntary nervous motion, but it is upon the artist of his art that the blame must be laid.

If the single portrait of an individual is a misrepresentation

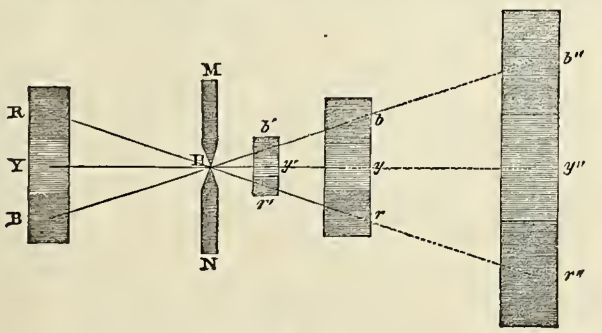

Fig. 44.

of his form and expression, the combination of two such pictures into a solid must be more hideous still, not merely because the source of error in the single portrait is incompatible with the application of the stereoscopic principle in giving relief to the plane pictures. The art of stereoscopic portraiture is in its infancy, and we shall therefore devote some space to the development of its true principles and practice.

In treating of the images of objects formed by lenses and mirrors with spherical surfaces, optical writers have satisfied themselves by shewing that the images of straight lines so formed are conic sections, elliptical, parabolic, or hyperbolic. I am not aware that any writer has treated of the images of solid bodies, and of their shape as affected by the size of the lenses or mirrors by which they are formed, or has even attempted to shew how a perfect image of any object can be obtained. We shall endeavor to supply this defect.

In a previous chapter we have explained the manner in which images are formed by a small aperture, H, in the side, M N, of a camera, or in the window-shutter of a dark room. The rectangles br, $b'r'$, $b''r''$, are images of the object R B, according as they are received at the same distance from the lens as the object, or at a less or a greater distance, the size of the image being to that of the object as their respective distances from the hole H. Pictures thus taken are accurate representations of the object, whether it be lineal, superficial, or solid, as seen from or through the hole H; and if we could throw sufficient light upon the object, or make the material which receives the image very sensitive, we should require no other camera for giving us photographs of all sizes. The only source of error which we can conceive, is that which may arise from the inflexion of light, but we believe that it would exercise a small influence, if any, and it is only by experiment that its effect can be ascertained.

The Rev. Mr. Egerton and I have obtained photographs of a bust, in the course of ten minutes, with a very faint sun, and through an aperture less than the hundredth of an inch; and I have no doubt that when chemistry has furnished us with a material more sensitive to light, a camera without lenses, and with only a pin-hole, will be the favorite instrument of the photographer. At present, no sitter could preserve his composure and expression during the number of minutes which are required to complete the picture.

But though we cannot use this theoretical camera, we may make some approximation to it. If we make the hole H a quarter of an inch, the pictures br, &c., will be faint and indistinct; but by placing a thin lens a quarter of an inch in diameter in the hole H, the distinctness of the picture will be restored, and, from the introduction of so much light, the photograph may be completed in a sufficiently short time. The lens should be made of rock crystal, which has a small dispersive power, and the ratio of curvature of its surfaces should be as six to one, the flattest side being turned to the picture. In this way there will be very little color and spherical aberration, and no error produced by any striæ or want of homogeneity in the glass.

As the hole H is nearly the same as the greatest opening of the pupil, the picture which is formed by the enclosed lens will be almost identical with the one we see in monocular vision, which is always the most perfect representation of figures in relief.

With this approximately perfect camera, let us now compare the expensive and magnificent instruments with which the photo-

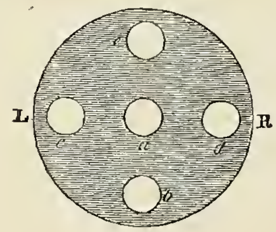

Fig. 45.

grapher practises his art. We should suppose his camera to have its lens or lenses with an aperture of only *three* inches, as shewn at L R in Fig. 45. If we cover the whole lens, or reduce its aperture to a quarter of an inch, as shewn at a, we shall have a correct picture of the sitter. Let us now take other *four* pictures of the same person, by removing the aperture successively to b, c, d, and e: It is obvious that these pictures will all differ very perceptibly from each other. In the picture obtained through d, we shall see parts on the left side of the head which are not seen in the picture through c, and in the one through c, parts on the right side of the head not seen through d. In short, the pictures obtained through c and d are accurate dissimilar pictures, such as we have in binocular vision, (the distance $c\ d$ being $2\frac{1}{2}$ inches), and fitted for the stereoscope. In the one through b, we shall see parts *below* the eyebrows, below the nose, below the upper lip, and below the chin, which are not visible in the picture through e, nor in those through c and d; while in the picture through e, we shall see parts above the brow, and above the upper lip, &c., which are not seen in the pictures through b, c, and d. In whatever part of the lens, L R, we place the aperture, we obtain a picture different from that through any other part, and therefore it follows, *that with a lens whose aperture is three inches, the photographic picture is a combination of about one hundred and thirty dissimilar pictures*

of the sitter, the similar parts of which are not coincident; or to express it in the language of perspective, *the picture is a combination of about one hundred and thirty pictures of the sitter, taken from one hundred and thirty differeut points of sight!* If such is the picture formed by a *three*-inch lens, what must be the amount of the *anamorphism*, or distortion of form, which is produced by photographic lenses of diameters from *three* to *twelve* inches, actually used in photography?*

But it is not merely by the size of the lenses that hideous portraits are produced. In cameras with two achromatic lenses, the rays which form the picture pass through a large thickness of glass, which may not be altogether homogeueous,—through *eight* surfaces which may not be truly spherical, and which certainly scatter light in all directions,—and through an optical combination in which straight lines in the object must be conic sections in the picture!

Photography, therefore, cannot even approximate to perfection till the artist works with a camera furnished with a single quarter of an inch lens of rock crystal, having its radii of curvature as six to one, or what experience may find better, with an achromatic lens of the same aperture. And we may state with equal confidence, that the photographer who has the sagacity to perceive the defects of his instruments, the honesty to avow it, and the skill to remedy them by the applications of modern science, will take a place as high in photographic portraiture as a Reynolds or a Lawrence in the sister art.

Such being the nature of single portraits, we may form some notion of the effect produced by combining dissimilar ones in the stereoscope, so as to represent the origiual in relief. The single pictures themselves, including binocular and multocular representations of the individual, must, when combined, exhibit a very imperfect portrait in relief,—so imperfect, indeed, that the artist is obliged to take his two pictures from points of sight different from the correct points, in order to produce the least disagreeable result. This will appear after we have explained the correct method of taking binocular portraits for the stereoscope.

No person but a painter, or one who has the eye and the taste of a painter, is qualified to be a photographer either in single or binocular portraiture. The first step in taking a portrait or copying a statue, is to ascertain in what aspect and at what distance from the eye it ought to be taken.

In order to understand this subject, we shall first consider the vision, with *one eye*, of objects of three dimensions, when of different magnitudes and placed at different distances. When we thus view a building, or a full-length or colossal statue, at a short distance, a picture of all its visible parts is formed on the retina. If we view it at a greater distance, certain parts cease to be seen, and other parts come into view; and this change in the picture will go on, but will become less and less perceptible as we retire from the original. If we now look at the building or statue from a distance through a telescope, so as to present it to us with the same distinctness, and of the same apparent magnitude as we saw it at our first position, the two pictures will be essentially different; all the parts which ceased to be visible as we retired will still be invisible, and all the parts which were not seen at our first position, but became visible by retiring, will be seen in the telescopic picture. Hence the parts seen by the near eye, and not by the distant telescope, will be those towards the middle of the building or statue, whose surfaces converge, as it were, towards the eye; while those seen by the telescope, and not by the eye, will be the external parts of the object, whose surfaces converge less, or approach to parallelism. It will depend on the nature of the building or the statue which of these pictures gives us the most favorable representation of it.

If we now suppose the building or statue to be reduced in the most perfect manner,—to half its size, for example,—then it is obvious that these two perfectly similar solids will afford a different picture, whether viewed by the eye or by the telescope. In the reduced copy, the inner surfaces visible in the original will disappear, and the outer surfaces become visible; and, as formerly, it will depend on the nature of the building or the statue whether the reduced or the original copy gives the best picture.

If we repeat the preceding experiments with *two eyes* in place of *one*, the building or statue will have a different appearance; surfaces and parts, formerly invisible, will become visible, and the body will be better seen because we see more of it; but then the parts thus brought into view being seen, generally speaking, with one eye, will have less brightness than the rest of the picture. But though we see more of the body in binocular vision, it is only parts of vertical surfaces perpendicular to the line joining the eyes that are thus brought into view, the parts of similar horizontal surfaces remaining invisible as with one eye. It would require a pair of eyes placed vertically, that is, with the line joining them in a vertical direction, to enable us to see the horizontal as well as the vertical surfaces; and it would require a pair of eyes inclined at all possible angles, that is, a ring of eyes $2\frac{1}{2}$ inches in diameter, to enable us to have a perfectly symmetrical view of the statue.

These observations will enable us to answer the question, whether or not a reduced copy of a statue, of precisely the same form in all its parts, will give us, either by monocular or binocular vision, a better view of it as a work of art. As it is the outer parts or surfaces of a large statue that are invisible, its great outline and largest parts must be best seen in the reduced copy; and consequently its relief, or third dimension in space, must be much greater in the reduced copy. This will be better understood if we suppose a *sphere* to be substituted for the statue. If the sphere exceeds in diameter the distance between the pupils of the right and left eye, or $2\frac{1}{2}$ inches, we shall not see a complete hemisphere, unless from an infinite distance. If the sphere is very much larger, we shall see only a segment, whose relief, in place of being equal to the radius of the sphere, is equal only to the versed side of half the visible segment. Hence it is obvious that a reduced copy of a statue is not only better seen from more of its parts being visible, but is also seen in stronger relief.

On the Proper Position of the Sitter.

With these observations we are now prepared to explain the proper method of taking binocular portraits for the stereoscope.

The first and most important step is to fix upon the position of the sitter,—to select the best aspect of the face, and, what is of more importance than is generally supposed, to determine the best distance from the camera at which he should be placed. At a short distance certain parts of one face and figure which should be seen are concealed, and certain parts of other faces are seen which should be concealed. Prominent ears may be either hid or made less prominent by diminishing the distance, and if the sight of both ears is desirable the distance should be increased. Prominent features become less prominent by distance, and their influence in the picture is also diminished by the increased vision which distance gives of the round of the head. The outline of the face and head varies essentially with the distance, and hence it is of great importance to choose the best. A long and narrow face requires to be viewed at a different distance from one that is short and round. Articles of dress even may have a better or a worse appearance according to the distance at which we see them.

Let us now suppose the proper distance to be *six feet*, and since it is impossible to give any rules for taking binocular portraits with large lenses we must assume a standard camera with a lens a quarter of an inch in diameter, as the only one which can give a correct picture as seen with one eye. If the portrait is wanted for a ring, a locket, or a binocular slide, its size is determined by its purpose, and the photographer must have a camera (which he has not) to produce these different pictures. His own camera will, no doubt, take a picture for a ring, a locket, or a binocular slide, but he does this by placing the sitter at different distances,—at a very great distance for the ring picture, at a considerable distance for the locket picture, and at a shorter distance for the binocular one; but none of these distances are

* See my *Treatise on Optics*, 2d edit., chap. vii. p. 65.

the distance which has been selected as the proper one. With a single lens camera, however, he requires only several quarter inch lenses of different focal lengths to obtain the portrait of the sitter when placed at the proper distance from the camera.

In order to take binocular portraits for the stereoscope a binocular camera is required, having its lenses of such a focal length as to produce two equal pictures of the same object and of the proper size. Those in general use for the lenticular stereoscope vary from 2·1 inches to 2·3 in breadth, and from 2·5 inches to 2·8 in height, the distance between similar points in the two pictures varying from 2·30 inches to 2·57, according to the different distances of the foreground and the remotest object in the picture.

Having fixed upon the proper distance of the sitter, which we shall suppose to be *six* feet,—a distance very suitable for examining a bust or a picture, we have now to take two portraits of him, which when placed in the stereoscope, shall have the same relief and the same appearance as the sitter when viewed from the distance of *six feet*. This will be done by a binocular camera, which we shall now describe.

The Binocular Camera.

This instrument differs from the common camera in having two lenses with the same aperture and focal length, for taking at the same instant the picture of the sitter as seen at the distance of *six* feet, or any other distance. As it is impossible to grind and polish two lenses, whether single or achromatic, of exactly the same focal length, even when we have the same glass for both, we must bisect a good lens, and use the two semi-lenses, ground into a circular form, in order to obtain pictures of exactly the same size and definition. These lenses should be placed with their diameters of bisection parallel to one another, and perpendicular to the horizon, at the distance of $2\frac{1}{2}$ inches, as shewn in Fig. 45, where M N is the camera, L, L′ the two lenses placed in two short tubes, so that by the usual mechanical means they can be directed to the sitter or have their axes converged upon him, as shewn in the Figure, where A B is the sitter *ab* his image as given by the lens L, and *a′b′* as given by the lens L′. These pictures are abviously the very same that would be seen by the artist with his eyes at L and L′, and as A L B= *a* L *b*=*a′* L′ *b′*, the pictures will have the same apparant magnitude as the original, and will in no respect differ from it as seen by each eye from E, E′, E*a* being equal to *a*L, and E′*a′* to *a*L.

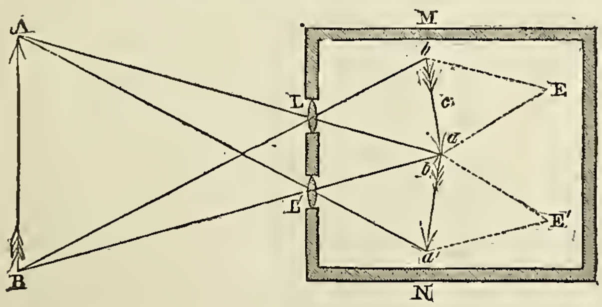

Fig. 45.

Since the publication in 1849 of my description of the *binocular camera*, a similar instrument was proposed in Paris by a photographer, M. Quinet, who gave it the name of *Quinetoscope*, which, as the abbé Moigno observes, means an instrument for seeing M. Quinet !. I have not seen this camera, but, from the following notice of it by the abbé Moigno, it does not appear to be different from mine:—" Nous avons été à la fois surpris et très-satisfait te retrouver dans le *Quenetoscope* la chambre binoculaire de notre ami Sir David Brewster, telle que nous l'avons décrite apaés lui il y a dix-huit mois dans notre brochure intitulée Stéréoseope." Continuing to speak of M. Quinet's camera, the Abbé is led to criticise unjustly what he calls the limitation of the instrument:—" En un mot, ce charmant appareil est aussi bien construit qu'il peut être, et nous désirons ardemment qu'il se répand assez pour récompenser M. Quinet de son habileté et de ses peines. Employé dans les limittes fixées à l'avance par son véritable inventeur, Sir David Brewster; c'est-à-dire, employé à reproduire des objets de petite et moyenne grandeur, il donnera assez beaux résultats. Il ne pourra pas servir, evidemment, il ne donnera pas bien l'effet stéréoscopique voulu, quand on voudra l'appliquer à de très-grands objets, on a des vues ou paysages pris d'une très-grande distance; mais il est de la nature des œuvres humaines d'être essentiellement boruées."* This criticism on the limitation of the camera is wholly incorrect; and will be made apparent, in a future part of the Chapter, that for objects of all sizes and at all distances the binocular camera gives the very representations which we see, and that other methods, referred to as superior, give unreal and untruthful pictures, for the purpose of producing a startling relief.

In stating, as he subsequently does, that the angles at which the pictures should be taken "are too vaguely indicated by theory,' † the Abbé cannot have appealed to his own optical knowledge, but must have trusted to the practice of Mr. Claudet, who asserts " that there cannot be any rule for fixing the binocular angle of camera obscuras. *It is a matter of taste and artistic illusion.*"‡ No question of science can be a matter of taste, and no illusion can be artistic which is a misrepresentation of nature.

When the artist has not a binocular camera he must place his single camera successively in such positions that the axis of his lens may have the directions E L, E L′ making an angle equal to L C L′, the angle which the distance between the eyes subtends at the distance of the sitter from the lenses. This angle is found by the following formula:—

$$\text{Tang. } \tfrac{1}{2}\,A = \frac{\tfrac{1}{2}d}{D} = \frac{1{\cdot}25}{D}$$

d being the distance between the eyes, D the distance of the sitter, and A the angle which the distance between the eyes,=2·5, subtends at the distance of the sitter. These angles for different distances are given in the following table:—

D=Distance of Camera from the Sitter.	A=Angle formed by the two directions of the Camera.
5 inches,	28° 6′
6,	23 32
7,	20 14
8,	17 46
9,	15 48
10,	14 15
11,	13 0
12, 1 foot,	11 54
13,	11 0
14,	10 17
15,	9 32
16,	8 56
17,	8 24
18,	7 56
19,	7 31
20,	7 10
24, 2 feet,	5 58
30,	4 46
36,	3 59
42,	3 25
48, 4 feet,	2 59
54,	2 39
60, 5 feet,	2 23
72, 6 feet,	1 59
84, 7 feet,	1 42
96, 8 feet,	1 30
108, 9 feet,	1 20
120, 10 feet,	1 12

The numbers given in the greater part of the proceding table can be of use only when we wish to take binocular pictures of small objects placed at short distances from cameras of a diminutive size. In photographic portraiture they are of no use. The correct angle for a distance of *six* feet must not exceed *two*

* See *Cosmos* vol. ii. pp. 622, 624.
† *Id.* vol. vii. p. 494. ‡ *Id.* vol. iii. p. 658.

degrees,—for a distance of *eight* feet *one and a half* degrees, and for a distance of *ten* feet *one and a fifth* degree. Mr. Wheatstone has given quite a different rule. He makes the angle to depend, not on the distance of the sitter from the camera, but *on the distance of the binocular picture in the stereoscope from the eyes of the observer!* According to the rule which I have demonstated, the angle of convergency for a distance of *six feet* must be 1° 59', whereas in a stereoscope of any kind, with the pictures *six* inches from the eyes, Mr. Wheatstone makes it 23° 32'! As such a difference is a scandal to science, we must endeavor to place the subject in its true light, and it will be interesting to observe how the problem has been dealt with by the professional photographer. The following is Mr. Wheatstone's explanation of his own rule, or rather his mode of stating it:—

"With respect," says he, "to the means of preparing the binocular photographs, and in this term I include both Talbotypes and Daguerreotypes,) little requires to be said beyond a few directions as to the proper positions in which it *is necessary* to place the camera in order to obtain the two required projections.

"We will suppose that the binocular pictures are required to be seen in the stereoscope at a distance of eight inches before the eyes, in which case the convergence of the optic axes is about 18°. To obtain the proper projections for this distance, the camera must be placed with its lens accurately directed towards the object successively in two points of the circumference of a circle, of which the object is the centre, and the points at which the camera is so placed must have the angular distance of 18° from each other, exactly that of the optic axes in the stereoscope. The distance of the camara from the object may be taken arbitrarily, for so long as the same angle is employed, whatever that distance may be *the picture will exhibit in the stereoscope the same relief* and be seen at the same distance of eight inches, *only* the magnitude of the picture will appear different. Miniature stereoscopic representations of buildings and full-sized statues are, therefere, obtained merely by taking the two projections of the object from a considerable distance, *but at the same time as if the object were only eight inches distant*, that is, at an angle of 18°." *

Such is Mr. Wheatstone's rule, for which he has assigned no reason whatever. In describing the binocular camera, in which the lenses must be only $2\frac{1}{2}$ inches distant for portraits, I have shewn that the pictures which it gives are perfect representations of the original, and therefore pictures taken with *lenses* or cameras at any other distance, must be different from those which are seen by the artist looking at the sitter from his camera. They are, doubtless, both pictures of the sitter, but the picture taken by Mr. Wheatstone's rule is one which no man ever saw or can see, until he can place his eyes at the distance of *twenty inches*! It is, in short, the picture of a living doll, in which parts are never seen in society, and parts hid which are always seen.

In order to throw some light upon his views, Mr. Wheatstone got "a number of Daguerreotypes of the same bust taken at a variety of different angles, so that he was enabled to place in the stereoscope two pictures taken at any angular distance 2° to 18°, the former corresponding to a distance of about six feet, and the latter to a distance of about eight inches." In those taken at 2°, (the proper angle,) there is "an undue elongation of lines joining two unequally distant points, so that all the features of a bust appear to be exaggerated in depth:,' while in those taken at 18°, "there is an undue shortening of the same lines, so that the appearance of a bas-relief is obtained from the two projections of the bust, the apparant dimensions in breadth and height remaining in both cases the same."

Although Mr. Wheatstone speaks thus decidedly of the relative effect produced by combining pictures taken at $2\frac{1}{2}$° and 18°, yet in the very next paragraph he makes statements entirely incompatible with his previous observations. "When the optic axes," he says, 'are parallel, *in strictness* there should be no difference between the pictures presented to each eye, and in this case *there should be no binocular relief*, but I find, *that an excellent effect* is produced when the axes are nearly parallel, by pictures taken at an inclination of 7° or 8°, and even a difference of 16° or 17° *has no decidedly bad effect!*"

That Mr. Wheatstone observed all these contradictory facts we do not doubt, but why he observed them, and what was their cause, is a question of scientific as well as of practical importance. Mr. Wheatstone was not aware† that the Daguerreotype pictures which he was combining, taken with *large lenses*, were not pictures as seen with two human eyes, but were actually binocular and monocular monstrosities, entirely unfit for the experiments he was carrying on, and therefore incapable of testing the only true method of taking binocular pictures which we have already explained.

Had Mr. Wheatstone combined pictures, each of which was a correct monocular picture, as seen with each eye, and as taken with a small aperture or a small lens, he would have found no discrepancy between the results of observation and of science. From the same cause, we presume, namely, the use of multocular pictures, Mr. Alfred Smee‡ has been led to a singular method of taking binocular ones. In one place he implicitly adopts Mr. Wheatstone's erroneous rule. "The pictures for the stereoscope," he says, "are taken at two stations, at a greater or less distance apart, according to the distance at which they are to be viewed. For a distance of 8 inches the two pictures are taken at angles of 18°, for 13 inches 10°, for 18 inches 8°, and for 4 feet 4°." But when he comes to describe his own method he seems to know and to follow the true method, if we rightly understand his meaning. "To obtain a binocular picture of anybody," he says, "the camera must be employed to take half the impression, and then it must be moved in the arc of a circle of which the distance from the camera to the *point of sight*§ is the radius for about $2\frac{1}{2}$ inches when a second picture is taken, and the two impressions conjointly form one binocular picture. There are many ways by which this result may be obtained. A spot may be placed on the ground-glass on which the point of sight should be made exactly to fall. The camera may then be moved $2\frac{1}{2}$ inches, and adjusted till the point of sight falls again upon the same spot on the ground-glass, when, if the camera has been moved in a true horizontal plane *the effect of the double picture will be perfect.*" This is precisely the true method of taking binocular pictures which we had given long before, but it is true only when small lenses are used. In order to obtain this motion in the true arc of a circle the camera was moved on two cones which converged to the point of sight, and Mr. Smee thus obtained pictures of the usual character. But in making these experiments he was led to take pictures *when the camera was in continual motion backwards and forwards for $2\frac{1}{2}$ inches*, and he remarks that "*in this case the picture was even more beautiful than when the two images were superimposed!*" "This experiment," he adds, "is very remarkable, for who would have thought formerly that a picture could possibly have been made with a camera in continual motion? Nevertheless we accomplish it every day with ease, and the character of the likeness is wonderfully improved by it." We have now left the regions of science, and have to adjudicate on a matter of opinion and taste. Mr. Smee has been so kind as to send me a picture thus taken. It is a good photograph with features enlarged in all azimuths, but it has no other relief than that which we have described as monocular.

A singular effect of combining pictures taken at extreme angles has been noticed by Admiral Lageol. Having taken the portrait of one of his friends when his eyes were directed to the object-glass of the camera, the Admiral made him look at an object 45°! to the right, and took a second picture. When these pictures were placed in the stereoscope, and viewed "without ceasing, turning first to the right and then to the left, the eyes of the portrait follow this motion as if they were animated."‖

* Phil Trans., 1852, p. 7.

† Mr. Wheatstone's paper was published before I had pointed out the deformities produced by large lenses. See p. 130.

‡ *The eye in Health and Disease*, by Alfred Smee, 2d edit 1854, pp. 85-95.

§ This expression has a different meaning in perspective. We understand it to mean here the point of the sitter or object, which is to be the centre of the picture.

‖ *Cosmos*, Feb. 29, 1856, vol. viii. p. 202.

This fact must have been noticed in common stereoscopic portraits by every person who has viewed them alternately with each eye, but it is not merely the eyes which move. The nose, and indeed every feature, changes its place, or, to speak more correctly, the whole figure leaps from the one binocular position into the other. As it is unpleasant to open and shut the eyes alternately, the same effect may be more agreeably produced in ordinary portraits by merely intercepting the light which falls upon each picture, or by making an opaque screen pass quickly between the eyes and the lens, or immediately below the lens, so as to give successive vision of the pictures with each eye, and with both. The motion of the light reflected from the round eyeball has often a striking effect.

From these discussions, our readers will observe that the science, as well as the art of binocular portraiture for the stereoscope, as in a transition state in which it cannot long remain. The photographer who works with a very large lens chooses an angle which gives the least unfavorable results; his rival, with a lens of less size, chooses, on the same principle, a different angle; and the public, who are no judges of the result, are delighted with their pictures in relief, and when their noses are either pulled from their face, or flattened upon their cheek, or when an arm or a limb threatens to escape from their articulation, they are assured that nature and not art is to blame.

We come now to consider under what circumstances the photographer may place the lenses of his binocular camera at a greater distance than $2\frac{1}{2}$ inches, or his two cameras at a greater angle than that which we have fixed.

1. In taking family portraits for the stereoscope, the cameras must be placed at an angle of 2° for 6 feet, when the binocular camera is not used.

2. In taking binocular pictures of any object whatever, when we wish to see them exactly as we do with our two eyes, we must adopt the same method.

3. If a portrait is wanted to assist a sculptor in modelling a statue, a great angle might be adopted, in order to shew more of the head. But in this case the best way would be to take the correct social likeness, and then take photographs of the head in different azimuths.

If we wish to have a greater degree of relief than we have with our two eyes, either in viewing colossal statues, or buildings, or landscapes, where the deviation from nature does not, as in the human face, affect the expression, or injure the effect, we must increase the distance of the lenses in the binocular camera. Let us take the case of a colossal statue 10 feet wide, and suppose that dissimilar drawings of it about *three* inches wide are required for the stereoscope. These drawings are *forty* times narrower than the statue, and must be taken at such a distance, that with the binocular camera the relief would be almost evanescent. We must therefore suppose the statue to be reduced n times, and place the semi-lenses at the distance $n \times 2\frac{1}{2}$ inches. If $n=10$, the statue 10 feet wide will be reduced to $\frac{10}{10}$, or to 1 foot, and $n \times 2\frac{1}{2}$, or the distance of the semi-lenses will be 25 inches. With the lenses at this distance, the dissimilar pictures of the statue will reproduce, when combined, a statue one foot wide, which will have exactly the same appearance and relief as if we had viewed the colossal statue with eyes 25 inches distant. But the reproduced statue will have also the same appearance and relief as a statue a foot wide reduced from the colossal one with mathematical precision, and it will therefore be a better or more relieved representation of the work of art than if we had viewed the colossal original with our own eyes, either under a greater, an equal, or a less angle of apparent magnitude.

We have supposed that a statue a foot broad will be seen in proper relief by binocular vision; but it remains to be decided whether or not it would be more advantageously seen if reduced with mathematical precision to a breadth of $2\frac{1}{2}$ inches, the width of the eyes, which gives the vision of a hemisphere $2\frac{1}{2}$ inches in diameter with the most perfect relief.* If we adopt this principle, and call B the breadth of the statue of which we require dissimilar pictures, we must make $n=\frac{B}{2\frac{1}{2}}$, and $n \times 2\frac{1}{2}=B$, that is the distance of the semi-lenses in the binocular camera, or of the lenses in two cameras, must be made equal to the breadth of the statue.

In concluding this chapter, it may be proper to remark, that unless we require an increased relief for some special purpose, landscapes and buildings should be taken with the normal binocular camera, that is, with the lenses $2\frac{1}{2}$ inches distant. Scenery of every kind, whether of the picturesque, or of the sublime, cannot be made more beautiful or grand than it is when seen by the traveller himself. To add an artificial relief is but a trick which may startle the vulgar, but cannot gratify the lover of what is true in nature and in art.

The Single Lens Binocular Camera.

As every photographer possesses a camera with a lens between $2\frac{1}{2}$ and 3 inches in diameter, it may be useful to him to know how he may convert it into a binocular instrument.

In a cover for the lens take two points equidistant from each other, and make two apertures, *c*, *d*, Fig. 43, $\frac{2}{10}$ths of an inch in diameter, or of any larger size that may be thought proper, though $\frac{2}{10}$ is the proper size. Place the cover on the end of the tube, and bring the line joining the apertures into a horizontal position. Closing one aperture, take the picture of the sitter, or of the statue, through the other, and when the picture is shifted aside by the usual contrivances for this purpose, take the picture through the other aperture. These will be good binocular portraits, fitted for any stereoscope, but particularly for the Achromatic Reading Glass Stereoscope. If greater relief is wanted, it may be obtained in larger lenses by placing the two apertures at the greatest distance which the diameter of the lens will permit.

The Binocular Camera made the Stereoscope.

If the lenses of the binocular camera, when they are whole lenses, be made to separate a little, so that the distance between the centres of their inner halves may be equal to $2\frac{1}{2}$ inches, they become a lenticular stereoscope, in which we may view the pictures which they themselves create. The binocular pictures are placed in the camera in the very place where their negatives were formed, and the observer, looking through the halves of his camera lenses, will see the pictures united and in relief. If the binocular camera is made of semi-lenses, we have only to place them with their thin edges facing each other to obtain the same result. It will appear, from the discussions in the following chapter, that such a stereoscope, independently of its being achromatic, if the camera is achromatic, will be the most perfect of stereoscopic instruments.

The preceding methods are equally applicable to landscapes, machines, and instruments, and to solid constructions of every kind, whether they be the production of nature or art.†

CHAPTER IX.

ON THE ADAPTATION OF THE PICTURES TO THE STEREOSCOPE.—THEIR SIZE, POSITION, AND ILLUMINATION

Having described the various forms of the stereoscope, and the method of taking the binocular portraits and pictures to which it is to be applied, we have now to consider the relation that ought to exist between the instrument and the pictures,—a subject which has not been noticed by preceding writers.

If we unite two dissimilar pictures by the simple convergency of the optical axes, we shall observe a certain degree of relief, at a certain distance of the eyes from the pictures. If we diminish the distance, the relief diminishes, and if we increase it, it increases. In like manner, if we view the dissimilar pictures in the lenticular stereoscope, they have a certain degree of re-

* It is only in a horizontal direction that we can see 180° of the hemisphere. We would require a circle of eyes $2\frac{1}{2}$ inches distant to see a complete hemisphere.

† See Chapters X. and XI.

lief; but if we use lenses of a less magnifying power, so as to bring the eyes nearer the pictures, the relief will increase. By bringing the eyes nearer the pictures, which we do by magnifying them as well as by approaching them, we increase the distance between similar points of the two pictures, and therefore the distance of these points, when united, from any plane in the picture, that is, its relief will be diminished. For the same reason, the diminution of the distance between similar points by the removal of the eyes from the picture, will produce an increase of relief. This will be readily understood if we suppose the eyes R, L, in Fig. 24, to be brought nearer the plane M N, to R′L′, the points 1, 1 and 2, 2 will be united at points nearer M N than when the eyes were at R, L, and consequently their relief diminished.

Now we have seen, that in taking portraits, as explained in Fig. 45, we view the two pictures, *a b*, *a′b′*, with the eyes at E and E′, exactly, and with the same relief in the air, as when we saw the original A B, from L, L′, and therefore EC is the distance at which the dissimilar pictures should be viewed in the stereoscope, in order that we may see the different parts of the solid figure under their proper relief. But the distance EC=LC is the conjugate focal length of the lens L, if one lens is used, or the conjugate equivalent focal length, if two achromatic lenses are used; and consequently every picture taken for the stereoscope should be taken by a camera, the conjugate focal length of whose lens corresponding to the distance of the sitter, is equal to *five* inches, when it is to be used in the common stereoscope, which has generally that depth.

Between the pictures and the purely optical part of the stereoscope, there are other relations of very considerable importance. The exclusion of all external objects or sources of light, excepting that which illuminates the pictures, is a point of essential importance, though its advantages have never been appreciated. The spectacle stereoscope held in the hand, the reflecting stereoscope, and the open lenticular stereoscope, are all, in this respect, defective. The binocular pictures must be placed in a dark box, in order to produce their full effect; and it would be a great improvement on the lenticular stereoscope, if, on the left and right side of each eye-tube, a piece of brass were to be placed, so as to prevent any light from entering the left angle of the left eye, and the right angle of the right eye.* The eyes, thus protected from the action of all external light, and seeing nothing but the picture, will see it with a distinctness and brilliancy which could not otherwise be obtained.

The proper illumination of the picture, when seen by reflected light, is also a point of essential importance. The method universally adopted in the lenticular stereoscope is not good, and is not the one which I found to be the best, and which I employed in the first-constructed instruments. The light which falls upon the picture is prevented from reaching the observer only by its being incident at an angle greater or less than the angle of reflexion which would carry it to his eyes. A portion of the scattered light, however, does reach the eye, and in Daguerreotypes especially, when any part of the surface is injured, the injury, or any other imperfection in the plate, is more distinctly seen. The illumination should be lateral, either by a different form of window in the front, or by openings on the two sides, or by both these methods.

When the lenticular stereoscope is thus fitted up, and the pictures in this manner illuminated, the difference of effect is equally great as it is between a picture as commonly seen, and the same picture exhibited as a panorama or a diorama, in which no light reaches the eyes but that which radiates from the painting itself, the reflexion from the varnish being removed by oblique or lateral illumination.

The great value of transparent binocular slides, when the picture is to be upon glass, is obvious from the preceding considerations. The illumination is uniform and excellent, but care must be taken to have the ground-glass in front of the picture, or the paper, when it is used, of a very fine grain, so that it may throw no black specks upon the sky or the lights of the picture. Another disadvantage of the transparent slides is, that the pictures are better protected from injury than those upon paper.

It is obvious from these considerations that the *size* of the pictures is determined, as well as the distance at which they are to be viewed. Much ignorance prevails upon this subject, both among practical photographers and optical writers. Large binocular pictures have been spoken of as desirable productions, and it has ben asserted, and claimed too, as a valuable property of the reflecting stereoscope, that it allows us to use larger pictures than other instruments. There never was a greater mistake. If we take a large picture for the stereoscope we must place it at a great distance from the eye, and consequently use a large stereoscope. A small picture, seen distinctly near the eye, is the very same thing as a large picture seen at a greater distance. The size of a picture, speaking optically and correctly, is measured by the angle which it subtends at the eye, that is its apparent magnitude. A portrait three inches high, for example, and placed in the lenticular stereoscope five inches from the eye, has the apparent size as a Kit Cat portrait in oil the size of life, three feet high, seen at the distance of five feet, the distance at which it is commonly examined; and if we increase the magnifying power so as to see the three-inch picture at the distance of two inches, it will have the same apparent size as the three feet oil portrait seen at the distance of two feet. If the pictures used in the stereoscope were imperfect pictures that would not bear being magnified, it would be improper to use them; but the Daguerreotypes, and the transparent pictures, which are taken by the first artists, for the lenticular stereoscope, will bear a magnifying power ten times greater than that which is applied to them.

If we take a large picture for the stereoscope, we are compelled by pictorial truth to place it at a distance from the eye equal to the equivalent focal distance of the camera. Every picture in every camera has the same apparent magnitude as the object which it represents; whether it be a human figure, or the most distant landscape; and if we desire to see it in its true relief in the stereoscope, we must place it at a distance from the eye equal to the focal length of the lens, whether it be an inch or a foot high. There is, therefore, nothing gained by using large pictures. There is, on the contrary, much inconvenience in their use. They are in themselves less portable, and require a larger stereoscope; and we believe, no person whatever, who is acquainted with the perfection and beauty of the binocular slides in universal use, would either incur the expense, or take the trouble of using pictures of a larger size.

In the beautiful combination of lenticular stereoscopes, which was exhibited by Mr. Claudet, Mr. Williams, and others, in the Paris Exhibition, and into which six or eight persons were looking at the same time, binocular pictures of a larger size could not have been conveniently used.

But, independently of these reasons, the question of large pictures has been practically settled. No such pictures are taken by the Daguerreotypists or Talbotypists, who are now enriching art with the choicest views of the antiquities, and modern buildings, and picturesque scenery of every part of the world; and even if they could be obtained, there are no instruments fitted for their exhibition. In the magnificent collection of stereoscopic pictures, amounting to about five thousand, advertised by the London Stereoscopic Company, there are no fewer than *sixty* taken in Rome, and representing, better than a traveller could see them there, the ancient and modern buildings of that renowned city. Were these *sixty* views placed on the sides of a revolving polygon, with a stereoscope before each of its faces, a score of persons might, in the course of an hour, see more of Rome, and see it better, than if they had visited it in person. At all events, those who are neither able nor willing to bear the expense, and undergo the toil of personal travel, would, in such a panorama,—an analytical view of Rome,—acquire as perfect a knowledge of its localities, ancient and modern, as the ordinary traveller. In the same manner, we might study the other metropolitan cities of the world, and travel from

* When any external light falls upon the eye, its picture is reflected back from the metallic surface of the Daguerreotype, and a negative picture of the part of the Daguerreotype opposite each eye is mixed with the positive picture of the same part.

them to its river and mountain scenery,—admiring its noble castles in our descent of the Rhine,—its grand and wild scenery on the banks of the Mississippi, or the Orinoco,—the mountain gorges, the glaciers, and the peaks of the Alps and the Ural,—and the more sublime grandeur wich reigns among the solitudes of the Himalaya and the Andes.

The following general rule for taking and combining binocular pictures is the demonstrable result of the principles explained in this chapter:—

Supposing that the camera obscura employed to take binocular portraits, landscapes, &c., gives perfect representations of them, the relief picture in the stereoscope, produced by their superposition and binocular union, will not be correct and truthful, unless the dissimilar pictures are placed in the stereoscope at a distance from the eyes, equal to the focal distance, real or equivalent, of the object-glass or object-glasses of the camera, and, whatever be the size of the pictures, they will appear, when they are so placed, of the same apparent magnitude, and in the same relief, as when they were seen from the object-glass of the camera by the photographer himself.

(*To be continued*)

SUGGESTIONS OF SUBJECT TO THE STUDENT IN ART.*

BY AN OLD TRAVELLER.

CHAPTER IX.

Turin the Magnificent—Piazza Castello—Piazza Madama—Triptic of Martyrs—Catalan Girardet—Barthelemi Hector—Geoffry Varaille—The Pastor of Angrogna—Midnight—A scene on the Iser—Keep at home!—Selethrytha—War in the Olden Time—The Captive—A Student—Alfred in Council—The Gerefa Lucumon.

Few cities present to the traveller a more cheerful aspect than is that first offered to his view by Turin; but how sorrowful are the recollections oppressing his heart as he traverses that fair metropolis of the Sardinian dominons! how gloomy are the pictures rising before him as he crosses the handsome squares of the city, or loiters beneath the long colonnades that surround the regal abodes of her kings!

Omitting all mention of matters purely political, we confine ourselves within the comparitively narrow limits of her ecclesiastical history, and even of that will touch only on the period when Francis I. of France was contending for supremacy in Piedmont with the Emperor Charles V.; yet see within how few months do we find the melancholy Triptica by whose lurid tints the heart is saddened, aud all power of enjoyment suspended, as now we pace the the superb length of the Piazza Castello, and cross that portion of the splendid square known in the present day as the Piazza Madama.

We are in the year 1535: the unhappy Waldenses—in our day, thanks to the improved spirit of the times and to their present sovereign, unhappy no more—have presented to Francis, then ruling them, their humble "entreaties for some liberty of concience;" but he replies to the effect that he had not burnt heretics by hundreds, in all parts of France, with intent to suffer a reserve of their pernicious hordes in the Alps." Here, accordingly, stands Catalan Girardet, one of the first to whom Francis gave proof of his determination to endure no heretic in the lands under his rule: the pile of martyrdom awaits him; its ominous form is reared but a few short paces from the spot whereon we stand, in this proud and magnificent Piazza Castello. The noble sufferer is brought forth: he looks around on the assembled multitude, the congregated masses regarding him with mingled feelings of reverence and grief, or of contempt and exultation, as their modes of belief and the varieties of their character prompt them.

Passing between the martyr and the foremost ranks of the spectators is a laborer driving an ass, on whose back there are panniers filled with stones. From these Giardet has selected two; you perceive that he presses them between his hands: he is speaking, and these are the words he addresses to certain ecclesiatics standing prominently forward—men who were among the most active of his persecutors:—

"Ye think to destroy our churches by the might of your persecutions, but as soon shall my weak hands avail to crush these hard unyielding stones."†

Here, too, died Barthelemi Hector; his offence the dissemination of the Scriptures; his fate such as that of Girardet—his last words ascribing "glory to God, for that he was judged worthy to suffer death in so righteous a cause."

The same beautiful site, but a somewhat later period, furnishes your third picture, and shall complete the sorrowful series, as presented by these shining haunts of the gay and fair,—although in truth they do but form a very small part of the dreary spectacles to which the pompous dwellings rising around us have borne witness. It is Geoffry Varaille who is now to suffer for the faith.

"The only son of a distinguished commander in the invading army 1488," says our author, ‡ "himself the inmate of a royal palace—first an admired courtier, and subsequently placed high among the most favored members of Catholic hierarchy, he is yet content to become the humble pastor of the despised Waldenses." And here, on the beautiful square before us, in this same Piazza Castello, did he too seal his testimony with his life.

Unlike Girardet—whom we looked on ere yet the fetters had been placed around him—Geoffry Varaille is fastened to the stake. He does not regard the bystanders; "the deep mysterious joy," declared by more than one eye-witness to have "irradiated his countenance" as he late addressed them, has given place to an expression of the tenderest pity: all his thoughts and care are at this moment devoted to the heart-broken creature whom you see beside him, the fatal cord falling from his nerveless grasp; to him "whose trembling hands," to cite the same authority, "were on that day to perform strange offices."*

For the hapless executioner is no other than the faithful servant of Varaille; one who has attended him from his childhood, and whose aged form shall be made to quiver beneath the scourge of the persecutor—as his pitying master but too well knows—when the cruel office here imposed on him shall have been performed.

Some influence, friendly to the martyr, or perchance the desire of his murderers to shorten his appeal to the multitude—thousands of whom bore subsequent testimouy to his constancy—caused the severity of the sentence to be somewhat diminished in his case by strangulation, previous to the kindling of the flames. But a refinement of cruelty, which makes the latter the more probable inference, and of which there is unhappily but to many instances in these annals, the attached servant of the martyr was the man doomed to effect this purpose. Furthermore, for he too has been found guilty of listening to the words of truth, the wages that await him are the loathsome dungeon, the scourge, the rack, and finally the branded brow, reducing him to a level with the convicted felon—for to all these has the uuhappy trembler here before you been already condemned.

During the same sorrowful period, but not within the walls of this fair city of Turin, did the Vaudois pastor, Martin Gonin, assume that crown of martyrdom which his judges vainly exhorted him to forego; but the life they pressed on his acceptance must have been purchased by apostacy, and the noble confessor could not hesitate. Of him, too, we fine mention in that history of the Waldenses so frequently cited, and it is in the following words that Miss Willyams commences her narration of the facts relating to his death:—

"One of the most distinguished pastors of the poor scattered flock, Martin Gonin of Angrogna, was entrusted by his brethren with the conduct of certain ecclesiastical affairs, for the arrangement whereof he had repaired to Geneva; returning thence to the valleys, he was apprehended as a spy, but on examination was found innocent of the charge. His jailer searched him never-

* Continued from page 315, vol. ix. No. x.

† See "History of the Waldensian Church," by Jane Luisa Willyams, p. 112, *et seq*, London. 1855.

‡ See Miss Willyams, *ut supra*.

* History of the Waldenses, chap. viii. p. 117.

theless, as he was about to leave the prison, when papers were discovered involving him in a charge still heavier. A spy might hope for mercy—a heritic never. The Vaudois pastor was tried a second time; was condemned to death by drowning, the sentence to be carried into effect amid the silence and darkness of night, on the 25 of April, 1526. In pursnanee of that decree the missionary's burning light was quenched in the waves of the Isère"

There were circumstances of painful interest connected with this midnight murder," says our author in conclusion; "but we will not dwell on those protracted agonies. The cold river of death has long been passed, and angels have welcomed the pilgrim on the other bank, and introduced him to the company of the redeemed."*

To the painter who may choose this melancholy episode of a dark history for his theme, the Isère here offers some of the most picturesque features of its course: the artist will remember that it is night, and the general heaven is even lowering in darkness, but between two clouds, which she has richly fringed with silver, there appears the cold bright moon. A radiant belt of light is thus thrown across the distant reaches of the river, while that portion of its waters soon to be desecrated by an act of cruel wrong and violence, lies lurid beneath the torches wherewith those darksome ministers of an evil will—in whose impure hands the martyr lies bound—have sought to diminish the perils besetting the latter portion of their way. These flash on wild rocks of varied hues; they call forth strange effects from all the objects, animate or inanimate, immediately surrounding the scene of crime and suffering; the former, comprising the executioners, their victim, and attendants, with a group concealed from them, and visible to the spectator only. On more than one face among those surrounding the doomed man you read pity and compunction; a youth is even gazing into the darkness beside him, as with the lingering hope that rescue might yet be near. The martyr takes no part in these emotions; his fettered hands are clasped in prayer, but on his countenance is none of the agony of one who "wrestles with his God:" peace ineffable is beaming from that face of holy trust, and every beautiful feature—clearly revealed by the torches—is bright with that foretaste of heaven already vouchsafed to the servant of truth.

On the edge of the circle of light produced by the torches, and all but beyond their influence, three figures are concealed within the foliage; the depth of shadow prevents you from perceiving them until after close examination, but this given, you behold a woman on whose features there is the anguish of despair: she has fixed her dry and grief-hallowed eyes on the martyr, and your prayer for her is, that her soul—so manifestly wedded to his own—may be permitted to depart with it, and be at rest. Beside, or rather partially behind her, are two others, whose faces you do not see; but you discern the grey locks that shade the cheek of the one as she turns to support the sinking form of the other—a girl methinks, for her dark tresses, falling over the arm of her companion, can scarcely belong to aught but youth. The child perchance of the martyr! Almost is one tempted to echo the awful denunciation of that master in song, who, speaking of this hapless country somewhat more than a century later,—when the atrocities committed by the troops of Pianezza drew forth letters of remonstrance from Oliver Cromwell to its ruler, then Charles Emanuel II., and to his wicked instigator, Louis XIV. of France,—burst forth in words that cannot be unknown to any one of you. I repeat them nevertheless, as does our author, from whose pages it is that I now take them,† the latter lines excepted, which are there omitted.—

"Avenge, O Lord, thy slaughtered saints, whose bones
Lie scattered on the Alpine mountains cold;
E'en them who kept thy truth so pure of old
When all our fathers worshipped stocks and stones,
Forget not: in thy book record their groans
Who were thy sheep, and in their ancient fold
Slain by the bloody Piedmontese, that rolled
Mother with infant down the rocks. Their moans
The vales redoubled to the hills, and they
To heaven. Their martyred blood and ashes sow
O'er all the Italian fields, where still doth sway
The triple-tyrant: that from thence may grow
A hundred fold, who, having learned thy way,
Early may fly the Babylonian woe." MILTON.

"South and north!" there is some one who is exclaiming; and he asks, "Have we nothing at home, that we should wander so far a-field?"

Quickly do we reply to the patriotic—or, if that be too sublime a word, to the jealous—querist, "We have, and in abundance." What do you say, for example, to another survey of the quaint old chroniclers? or, to begin with the beginning, will you go first to that region of fable within whose shadowy precincts the earliest annalist of every land finds the more remote of his researches ever prone to laud him? Here, to commence with, is a picture grouped for us in very far-gone days, and by actors who did certainly not calculate on having their proceedings depicted in these present times. It has never been painted; but so much the better, and your story will look all the fresher in the eyes of the beholder for that circumstance: the facts are these.

Towards the close of the sixth century, and no long time after the foundation of East-Anglia into a monarchy by Uffa, there lived a brave and powerful king of the Varni, to whose heir, called Radiger, was betrothed the East-Anglia princess, Selethrytha. But, subsequently preferring the alliance of Theodebert the Frank, whose sister was his own wife, the king of the Varni compelled Prince Radiger to marry into the family of Thierri, King of Austrasia—now France—his betrothal to the lady of our land notwithstanding.

But the two Varnian chiefs had neglected to ask the consent of one person, whose goodwill was yet found to be essential to the peaceful conclusion of the business—this was no other than the East-Anglian princess herself; and our gentle Selethrytha—whose name, as the learned tells us, signifies nothing less than "an earnest threatener"—no sooner became aware of that oversight, than she resolved to make all parties repent of their omission: to that end she gave herself no repose until she had stirred up her countrymen to fall upon the people of the Varni with fire and sword.

But now, lest your displeasure with this lady, who so well knew how to assert her own rights, should influence you to the degree of rejecting her, as Prince Radiger did, I must remind you that the indignity she had suffered was then held to deprive the party enduring it of reputation; and the injured princess had no longer the right to hold up her head among the noble virgins and matronage of her nation, and one equally honorable with themselves. Your recollection of this will serve in some measure to excuse her in your eyes, as it did in those of her people, by whom it was considered so complete a justification, that they embarked heart and soul in her cause.

To no leader less profoundly interested than herself would the offended lady entrust the duty of avenging her. It is true that the fleet, in the foremost of whose galleys she sailed, was commanded by her brother, whom she commissoned to bring the principal culprit to her feet; but it was to herself that she reserved the right of inflicting the death she had already awarded to his crime.

Many battles ensued, but these I do not describe, although none who love such theme is forbidden to paint them: let it now suffice to say that our islanders were victorious; they cut all opposing them to pieces in the most approved method of the time, and returned to their lady with songs of triumph.

But the trophies laid before her were rejected with disdain; Selethrytha drove her defenders from her presence with reproaches that did honor to her name: they had done nothing, the offending Radiger was still at large, and until they had given him bound and helpless to her hand, let them look for little credit for their work.

Again the furious tribes of Suffolk and Norfolk were poured, a fiery stream, upon the shores of the Rhine; and when all had been rendered desolate to the lady's fullest content, her enemy was himself found to be among her captives.

* See "History of the Waldensian Church in the Valleys of Piedmont," book viii. p. 113.

† History, *ut supra*, book x. "The Slaughtered Church," p. 151.

And now begins your work—if you have not already commenced it at some moment more congenial; and in that case now *proceeds* your pleasing toil, for you can scarcely refuse to paint me the scene we have before us.

She stands proudly within her tent—the beautiful rejected; the lofty stature she derives from her large-limbed race not surpassing the limits proper to the perfection of womanly beauty, and the whole figure utterly faultless in its richly-developed proportions. One finely moulded arm is raised with a most graceful action; the firm full hand—not hard of outline, or masculine in its character, as might have been, had Selethrytha given evidence of cruelty in any cause less sacred than the defence of her honor—but most feminine in its soft flexible forms, and of color and texture such as ivory might exhibit, were the spirit of a blush-rose breathing through its veins: this irreproachable hand, I say, is lifting aside the heavy clusters of her hair—a sunny brown—and gives to view a clear candid brow, beneath which there beam two lustrous eyes, well opened, beautifully formed, and now fixed with unflinching steadfastness of gaze on the features of the doomed Radiger.

He, too, is of noble port and lordly presence; he stands before her with a glance direct and fearless as her own. The axes of her people are uplifted for his death; they glitter coldly, they quiver in the hands that unwillingly restrain them, impatient of delay. Did he now seek her pardon, did he bend beneath the haughty looks that question his own, did he move so much as an eyebrow as the menacing weapons rise bright around him, she would doubtless give the signal for them to fall, and the days of Radiger would find their end. But the proud, firm gaze she bends on him is met by one yet firmer: nay, after looking for some few seconds at the handsome face before him, the captive prince, unmindful of the gleaming axes, begins to change the look of bold defiance with which he had first sought the eyes of his enemy, for one of frank admiration and delight; he has forgotten all but the radiant loveliness of that bright vision, and the captor, fairly baffled, feels a blush threatening to steal over the whiteness of her brow: this time not entirely of anger.

Conscious then, perchance, to that approach of manifest defeat—for her terrors have clearly failed to make her enemy quail—perchance, too, remembering that the offensive marriage of Radiger had been forced upon him for purposes purely political, and was not of his own seeking, the lady closes her scrutiny by waving a sign to her warriors, who draw back to the utmost limits of the pavilion, and she is at liberty to confer with her captive.

The words of their dialogue I am not prepared to repeat, but the result of it was, that the sister of Theodebert was sent back to Austrasia, and the East-Anglian princess, returning as the wife of her sometime foe, considered herself to have worthily vindicated her name from the reproach that might have fallen upon it, and felt that she might henceforth hold her head well up among the noblest matrons of her country.*

And now, may not the semblance of this handsome pair and their surroundings help to make us a picture worthy of its place in some fair gallery? You will treat the subject in such sort as shall ensure its welcome in the highest—there can be no doubt of that. For the eyes of our Selethrytha, what is their color?—through those long silky lashes, and in certain lights, they look almost black, yet black they are not—"over-gods forbode!" they are not even grey, although they might be such with less to startle one's sense of the right and fitting; and the rather as grey eyes, supposing them of the right color and quality, have also that property of looking black which some admire; but oh! better than all blackness—unless it be that of the large eastern eye, which, by the way, is *not* black—is *your* color, ye thoughtful and earnest eyes of grey. But Selethrytha's eyes are not grey, they are blue, and if they have not that rare and priceless tinge of the violet which proves that love, deep as the love of seraphs, is in the nature of the possessor, and quickening every pulse of the true and steadfast heart below them, yet neither are they of that cold, glittering, snake-like hue sometimes called blue, but chiefly for lack of some more closely descriptive name for the color, or rather no-color, in whose steely paleness you see nought better than the concentration of self-worship. No; give my proud, resentful, nay, fierce, if it must be so, and cruel princess, no eye such as these; her orbs are blue, full-tinted, and, if without that hue of heaven aforesaid, the ever-blessed violet, that is because the distinction thereof is vouchsafed to few in the world we breathe in. Many shall wear it in a better region—'tis the faith we hold to; but here below, if you see it more than twice in a life-time, believe that you are favored beyond your fellows. A good bright, generous tone of blue then are the eyes for my Selethrytha's wear, and here enough; the rest I leave to your excellent good judgment and never-to-be-questioned taste.

In the same work, and with relation to the most admired of our early sovereigns, I find an incident of later period, described by the friend and biographer of Alfred—the churchman Asser, namely—which has also a certain interest, as marking the habits of a man respecting whom we could scarcely know too much or see too many delineations in our galleries. The words, as altered somewhat for my present purpose, are these:—

Passing over the time, "when a young man, and of a youthful mind," as we learn from the reluctant admissions of his attached biographer, he would not hear the oppressed when they came to him, but treated the poor "as of no estimation," and when his kinsman St. Neot admonishes the king with all faithfulness, exhorting him to "to cease from wandering in depraved manners," his sins "with alms to redeem, and with tears to abolish;" when the same unflinching monitor adds, "depart entirely from thy unrighteousness, or much shalt thou suffer in this life, and surely shalt thou be deprived of the kingdom thou art misruling." Passing this, nor yet lingering on that fulfilment of some portion thereof to be found in the sufferings endured from "that swain's evil wife, whom he feared because she would scold," as the same writers tells us, and the story of whose burnt bread is so well known, let us come to the time when, all youthful errors abjured, Alfred has won for himself the titles of "the just," "the wise," and "the truth-teller," even from those severe judges and true friends, of whose rectitude in his behalf you have proof above.

Many works of great importance to the future advancement and culture of his people have now proceeded from the pen of the learned monarch—singularly learned for his day, and it is as a student that I want you set him before us. Thus it is that we have him. The time is a wild night in autumn of the year 893; the wind whistles fitfully through the many crevices of the royal abode and its ill-fitting doors and wnidows; the latter, but recently furnished with the luxury of horn panes, shake and rattle as the blast raves around them. The noble-looking occupant of the rude chamber suffers little interruption from this circumstance, but sometimes, as a gust of more than common violence comes raving through the building, his head, previously bent over his employment, is slightly raised, and a glance of satisfaction is given to the tall waxen tapers that supply him with light, these steadily burning in the clear horn casings, which he had himself contrived for them, bid calm and successful defiance to the airs that, blowing unheeded around the head of the observer, were seen with pleasure to assail as vainly the good shelter he had invented for his light.

At once a lamp and a timepiece, the slender shaft now permits one of the small metal globes, attatched to its length at equal distance, to drop with ringing sound into the brazen bowl prepared for its reception, thus giving King Alfred to know that the short time which alone his many avocations permitted him to bestow on the object then filling his thoughts was expended; and rising from a board whereon he had been tracing certain lines, segments of circles, &c., the foreshadowings of improvement contemplated in the naval architecture of the period, the earnest student lays his rough pencil aside.

* The facts of this legend are taken from the Greek historian Procopius, an author not known to the present writer, by Mr. Sharon Turner, from whose "*History of the Anglo-Saxons*," and from Gibbon's "Decline and Fall of the Roman Empire," it was taken some years since for a work then published; it is from the last-mentioned publication, "Stories and Studies from Chronicles and History," namely, that the above has now been, not extracted, but adapted to the writer's present purpose.

He now gives the signal that on official, appointed for that hour, and who, as he doubted not, was waiting without, might enter his presence, when the Gerefa Lucumon—punctual, as is ever the servant of a master exact in the measurement of his own time—stands instantly before his lord.

But the marks of heavy care are on his brow, and his compressed lips are eloquent of something much amiss, although as yet no sound escapes them.

"Then it is true that the restless Hæsten hath left his lair on the Norman coast, and it is indeed to our own shores that the Sea-King shapes his course?" observes King Alfred, the face of the Gerefa* being a sufficiently speaking exponent of the information his master had sent him to gather, in consequence of rumors lately brought him.

"It is even so, noble king,' replies Lucumon; "his ships are off the Kentish coast; already has he destroyed the forts constructing by your orders in the fens, and his barbarian hordes have well-nigh completed a strong line of defence along the Rother."

He is a noble leader," rejoins the generous Alfred, "and must be worthy met. Behold! Sigeric and Ethelwyn come to share our council," he adds, as the thanes he mentions are seen entering the chamber. "Summon our trusted Ceolwulph, with the Bretwalda* Ethelbald; let our honored kinsman Neot also know that we crave his presence; pray our good Asser to accompany him, and return thyself to take part in this matter."

"But see thou bring more cheerful looks with thee," continued the speaker, with a friendly smile; "thy wisdom hath aided me through as dangerous a juncture: redoubted as this Hæsted is, fear not, my good Lucumon, thou shalt see me well through this, our best efforts, and the blessing of Heaven on them to aid."

That the confidence thus expressed was well-founded, you will all remember, a series of victories followed: the wife and family of Hæsten, twice brought as prisoners to the presence of Alfred, were twice returned, with costly presents, to their natural protector, the beaten and baffled Sea-king; and the Danes, with their allies, the Frisians, were ultimately driven from the land.

Take now either or all of the scenes suggested by these events, unless you prefer the din of battle rather, and in that case you may depict the death of the Gereta Lucumon, who fell, to the lasting grief of Alfred, in the last battle fought on this occasion.

The fearful ravages to which the country had been exposed were followed by a pestilence that for three years "filled the nation with the bitter death of straw."† offering but too many occasions for the exercise of those virtues which placed Alfred high among the greatest, if they did not render him the very greatest sovereign the world has ever produced.

From La Lumiere.

ON THE INFLUENCE OF ELEVATED TEMPERATURES ON COLLODION.

The high temperature which has reigned at Paris during the latter part of July and the first two weeks of August, has enabled us to make some observations on the influence which strong heats may have on the collodion film, sensitized or non-sensitized.

This influence is manifold, sometimes it acts on the glass itself before being immersed in the bath, at others on its withdrawal from the bath of silver, while the glass is draining, or during exposure in the camera, or at the moment of development.

Let us examine each of these cases separately.

The cleaning of the glasses, during the temperatures which we have had of late, is attended with unheard of difficulties. This is owing to several causes. First, the atmosphere of the workroom, when the collodion process is practiced, is always damp; this dampness condenses on the glasses and persistently adheres thereto, rendering the operation of cleaning difficult. There even remains upon the glasses, after prolonged rubbing with dry linen, a number of streaks of moisture which only appear after the production of the proof. These little streaks are formed by a slight reduction of silver which stains the blacks, but which appear also in the covered parts, especially in the positive on glass, if examined through the glass. Neither chamois skin nor linen washed in lie and warmed, give absolute clearness to the glass, nor have I found silk to be irreproachable.

Another cause often interferes with the cleaning process, I mean the moisture of the hand, which renders great precaution necessary in touching the rags. Streaks of grease should cause the rejection of every one so attainted.

Thus, besides the ordinary difficulties in cleaning the glasses, we find a new cause of accident which can only be avoided by minute cleanliness.

While speaking of the cleaning process, I advise photographers to employ a solution of aqua regalis to remove the persistent stains of reduction which resist the ordinary methods.

This solution cleans the surface of the glass perfectly, removes all the terreous or metallic oxydes which are formed on the surface; a little alcohol or ether will then be sufficient to obtain a perfectly clean glass. Let us pass to the changes experienced by the collodion itself.

Notwithstanding the changes which the collodion formulas undergo when we have to work in a temperature of from 25° to 35° it sometimes happens, and, moreover, I have thoroughly assured myself of this within the last few days in various establishments, that the film of collodion, after extension on the glass, dries very rapidly. This fact is not observed on glass of small dimensions, unless, at least, we allow a considerable time to elapse between the moment when the collodion is poured upon the glass and that when it is plunged in the bath. But on whole plates, and with stronger reason, and on glasses of larger dimensions, the parts of the collodion first spread undergoes evaporation sufficiently rapid to cause these parts to stain the glass after development. The only way to remedy this is by rapidly pouring a very abundant quantity of collodion on the glass. It is better to lose the excess of fluid than expose ourselves to the risk of having a half dried glass after sensitizing.

Supposing the collodion has been spread quick enough to prevent a rapid drying, it may nevertheless happen that the film may be completely dry in certain places on withdrawal from the bath: in this case a greater or less number of little hollows, all of which leave their mark after development, are seen on the surface of the sensitive film. These reductions stain the proof throughout and are highly detrimental to large size positives on glass. We did not think, in this case, it was necessary to change the formula of the collodion, and to prevent this drying we added a quantity of alcohol at 40°, the quantity being governed by the temperatures to the silver bath. This addition of alcohol has always succeeded well with us. To prevent as far as possible all failures or accidents in the drying process, rapid preparations must be employed. We will unfortunately be obliged sometimes to sacrifice the beauty of the proof, but this sacrifice is sometimes necessary, especially in the case of portraits.

As to veils produced by heat, they are as easy to be removed as veils produced by any other cause. We have had no other view in writing these lines than to mention certain changes and accidents experienced by all, and which in most cases it is easy to prevent.

ERNEST CONDUCHE.

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* *Gerefa*: the officer bearing this name, from which it seems probable that we derive our modern "sheriff," was one of much consequence in the executive; but his duties were of a character so widely varied that we know of no office now existing that could be called strictly equivalent. There were three classes of gerefa. See "Stories and Studies from Chronicle and History, vol. i. p. 124, *et seq.*

† The Bretwalda was a leader of high command, whether in peace or war.

‡ Among the fierce Northmen of those days all who did not die in battle were said to "die a straw death," the expression, if uttered in scorn, not unfrequently procuring for either the offending utterer, or the affronted listener—nay, sometimes perhaps for both—an exemption from the disgrace and bitterness thereof, by the more violent and more congenial mode of ending life consequent on the quarrel thus occasioned.

Sleeping Children

THE COLLODIO-ALBUMEN PROCESS.

Being the substance of a paper read before the Northampton Photographic Society, August 13, *by* William Ackland.

It is now generally admitted by all photographers, that negatives taken on glass far exceed any of a similar production on paper, as regards rapidity of action, beauty of definition, and ease in manipulation; but it must be also allowed that there are very serious objections to the general adoption of the collodion process (as usually employed) for portraying the various points of interest a photographic tourist may meet with on a journey.

The main objection to the use of collodion for taking views is its loss of sensitiveness when once the excited film becomes dry; hence it is necessary to prepare the plates, expose them in the camera, and develope the latent image within a very short time —too short, indeed, to be of much utility in taking landscapes &c., except those situate within a few minutes' walk of the operating room. To obviate this, many adopt the plan of carrying with them a portable tent covered with some material that only admits yellow light; or they employ a camera so constructed, that the plate may be sensitized and the image developed within the body of the instrument. But unfortunately both these plans present many inconveniences: the tent especially with the materials necessary to be used, being bulky and not of easy transport, while the heat within under a burning sun is most oppressive, and the manipulation much more difficult than when operating at home. To remedy these objections, many plans have been adopted; and among the first may be mentioned the use of nitrate of magnesia and nitrate of zinc by Messrs. Spiller and Crookes. These materials, by their deliquescent properties, keep the surface of the excited film over which they are spread slightly moist, and in a condition to receive the impressed image. Another and more simple mode of proceeding is the use of honey, as introduced by Mr. Shadbolt; but these processes have not yielded that constant success which is so essential to enable the amateur to practise them.

The great objection to the above is, that in order to render the plate sensitive, a definite amount of nitrate of silver must remain on its surface; and to obtain this *enact* quantity is more a matter of chance than certainty, If too much remains, it crystallizes on the plate and destroys the continuity of the collodion film; if too little, it is less sensitive to light. Another evil is the tenderness of the collodion film during the development which requires to be long continued. Dr. Mansell has also introduced a plan by which stains, which sometimes occur, may be obviated but still it must be admitted that these processes fail in the hands of the majority of amateurs; although the gentlemen above referred to, and other skilled photographers, have produced the most charming results by them. Mr. Llewelyn's oxymel process has nearly the same objections as the honey process partaking as it does of many of its defects and advantages.

The invention of Dr. Taupenot, however, which is termed the collodio-albumen process, has none of the inconveniences of the foregoing, and yet retains all their advantages; and it is this process which this paper is intended to bring under your notice. When the imperfect instructions, as given by the inventor, were followed out, results were obtained which promised ultimate success, provided the failures which sometimes occurred could be traced to their cause and remedied. These failures were of such a nature that the amateur would possibly have been induced to give up the process in despair; but it is considered that the following directions may be confidently relied upon for success where the manipulations are carefully performed. My attention was called to this subject on its first publication in France, and the results I obtained (although failures were frequent) convinced me that when once their cause were understood, this process would be generally employed for taking landscapes and still-life pictures; and with a view to discover them, I devoted all my spare time to the subject, and published the results in December last, in the form of a chapter on this process, in "Thornthwaite's Guide to Photagraphy." This has placed my description in the hands of many photographers and amateurs, and as natural consequence I have received numerous letters containing the various failures of my correspondents: some of these I had previously met with, others were new to me. I therefore in June last commenced making a new series of experiments, and I now propose to give the results of my extended investigations, merely premising that if the directions I shall give are strictly followed, success must be the natural consequence, as I can venture to assert that failures are less frequent in practising this process than in any other. Before entering into the general description, it may be as well to mention the advantage of this process over all others for depicting the varied scenery that the traveller meets with in his daily rambles. In the first place, a stock of plates sufficient for a fortnight's use may be prepared before leaving home, exposed in the camera as opportunities offer, and the development left until returning; there is also no process existing where the time of exposure may be so varied as in the collodio-albumen. In the third place, if the exposure has been one-third more than would have been sufficient, a little less silver in the developing fluid restores the balance, while an under-exposed picture may often be fully brought out by an increased dose of the silver developing fluid; indeed it is only necessary to expose for the deepest shades, as the high lights have but little tendency to suffer from over-exposure. I also think, when viewing the specimens before you, it will be found that for beauty of definition, development of middle tints, and artistic contrasts of light and shade, the collodio-albumen excels every known process; whilst its freedom from failures is such, that forty-nine good negatives may be fully anticipated from fifty carefully prepared plates.

The solutions necessary for this process are—

Cleansing solution,
Collodion bath solution,
Dilute nitric acid,
Dilute ammonia,
Tincture of iodine,
Sugar solution,
Albumen bath solution,
Negative collodion and iodising solution,
Pyrogallic solution,
Silver developing solution, and
Fixing solution.

Cleansing solution.

Tripoli	2 drms.
Cyanide of potassium	2 drms.
Rain or distilled water	2 oz.

Dissolve the cyanide of potassium in the water, then add the tripoli, and shake well until perfectly mixed.

Dilute Nitric Acid.

Nitric acid	½ drm.
Water	2 oz. mix.

Dilute Ammonia.

Liquid ammonia	½ drm.
Water	2 oz. mix.

Tincture of Iodine.

Iodine	½ drm.
Alcohol	1 oz. mix.

Sugar Solution.

White sugar	2 oz.
Acetic Acid	1 drm.
Water	1 oz.

Dissolve the sugar in the water, then add the acetic acid, and filter for use.

Collodion Bath Solution.

Nitrate of silver	1½ oz.
Iodide of potassium	3 grs.
Carbonate of soda	5 grs.
Distilled water	20. oz.

Dissolve the nitrate of silver in 3 oz. of the water, the carbonate of soda and the iodide of potassium each in ½ oz. of water seperately. When perfectly dissolved, mix these three solutions and shake well together so as to thoroughly incoporate them; then add the remaining 16 oz. water and again shake well together. Now add dilute nitric acid drop by drop until the solution, when applied to a leaf of Clark's test-paper, turns its violet color to a slightly redish tint; to this add ½ drm. of dilute nitric acid, filter, and the solution is ready for use. Should too much dilute nitric acid have been previously added, so that the leaf of Clark's test-paper turns to a decided red color, it must be neutrallized by adding a few drops of dilute ammonia until the color of the test-paper is but slightly changed to redness; then add the ½ drm. of dilute nitric acid as before specified. Then testing of the bath solution is one of the *most important* chemical manipulations that occur in photography, and the amateur frequently fails, from imagining that sudden changes of color will be produced on the test-paper on applying the bath solution, but this is not to be expected, for the proper amount of change is very slight, although sufficiently evident to a careful observer; the least tendency to blueness indicating an alkaline condition, and the smallest amount of redness an acid condition; whereas if no change of color is produced, the solution is said to be neutral. In order to observe these slight changes of color, a perfectly clean glass rod should be dipped into the solution and the wetted part applied to the colored side of the test-paper, so as to leave a drop of the fluid in contact with the surface; this is allowed to remain one minute, then shaken off, and the change produced observed in good *daylight* (as artificial or even dull light is not sufficient). It is advisable to test the bath solution from time time in order to ascertain that it retains its original normal condition of slight acidity; and should such not be the case, it must be remedied, as before stated. It is recommended to prepare twice as much of this solution as will be needed for the collodion bath, as it is used in combination with acetic acid to form the albumen bath solution.

Albumen Bath Solution.

Collodion bath solution	20 oz.
Glacial acetic acid	½ oz.
Kaolin	½ oz. mix.

This solution must be carefully filtered before using; but it is advisable to allow the kaolin to remain at the bottom of the bottle when the fluid is not in use, as it has the property of preventing the bath solution from becoming brown by use.

Iodized Collodion.

Negative collodion	6 drms.
Iodizing solution	2 drms.
Glycerine	1 drop.
Tincture of Iodine	6 drops.

These must be mixed together and allowed to settle for at least twelve hours; then pour off the clear solution into a perfectly clean bottle in order to get rid of any insoluble or floating particles. The above iodized collodion will retain its sensitiveness not longer than a fortnight; it is therefore abvisable to mix no more than can be used in ten days.

Iodized Albumen.

White of egg (free from yolk)	10 oz.
Honey	1 oz,
Yeast	1 tablespoonful.
Iodide of calcium	20 grs.
Bromide of calcium	10 grs.
Water	1 oz.

Dissolve the iodide and bromide of calcium in the water, then add it to the white of egg, honey and yeast previously mixed together and contained in a tall glass jar of at least one pint capacity; tie a piece of paper pierced with holes over the top to keep out dust, and place the whole near a fire or in a warm situation, where the temperature is not lower than 70° nor higher than 90°. In a few hours fermentation commences, which is evident by bubbles of gas rising through the liquid. This action continues for four or five days; when it ceases, filter the whole through a double thickness of fine muslin.

This filtered liquid is the iodized albumen, which, if put up in 4-oz. bottles and stowed away in a cool situation, will keep good for months.

Those who object to the trouble of preparing this fluid can purchase it ready for use.

Pyrogallic Solution.

Pyrogallic acid	15 grs.
Glacial acetic acid	2 drms.
Distilled or rain water	7 oz.

Dissolve the pyrogallic acid in the water, then add the acetic acid, and filter for use.

Silver Developing Solution

Nitrate of silver	1 drm.
Acetic acid	2 drms.
Distilled or rain water	7 oz.

Dissolve the nitrate of silver in the water, then add the acetic acid, and filter.

Fixing Solution.

Hyposulphite of soda	2 oz.
Water	1 pint.

Dissolve.

Cleaning the Plate.

The glass usually employed for this purpose is patent plate, which can be obtained of all the usual sizes used by photographers ready cut, and the edges slightly ground. Having selected a plate that fits the plate-frame of your camera, pour a teaspoonful of the cleansing solution over the centre of the plate, and with a linen pledget well rub it over every part back and front, then rinse in an abundance of cold water to remove every particle of the cleansing solution, wipe dry with a fine diaper cloth, and polish with a second cloth of the same material

Coating with Iodized Collodion.

This is performed in the usual manner, taking especial care that no floating particles exist in the iodized collodion or the atmosphere of the operating room.

Exciting the Collodion Film.

The plate, after being coated with iodized collodion, and the ether on its surface allowed to evaporate, so that the film appears set, must be plunged (by the aid of a glass-dipper) with one downward movement into a bath filled to within an inch of the top with collodion-bath solution; after being allowed to remain undisturbed for one minute, it is then partially lifted out three or four times, to facilitate the removal of the oily appearance it presents. When the surface appears uniformly wetted, the plate is removed from the dipper, allowed to drain a few seconds, and is then placed, collodion side upwards, on a levelling-stand, and a moderate stream of water allowed to run over its surface from a tap for at least two minutes, so as to wash off every particle of the bath solution. The plate is now removed from the levelling-stand, the back well washed with water, and then placed nearly upright (with the face against a wall) on *clean* filtering-paper for one minute to drain. This takes place more effectually if the plate rests with one corner only on the filtering-paper; for if the entire edge of the plate touches it, capillary attraction prevents at least one inch of the lower part from being effectually drained.

Coating with Albumen.

Having allowed the plate to drain one minute, pour over its surface a mixture of 7 drachms of iodized albumen and 1 drachm of sugar solution; pour off this mixture into a measure, and again cover the plate three separate times, so as throroughly to mix the albumen with the moisture on the plate; then drain off as much as possible of the albumen mixture, and place the plate nearly upright on one of its corners on clean filtering-paper, with the face against a wall to dry, which takes place in about one hour. This drying may with advantage be effected by the application of artificial heat; taking care that the temperature does not exceed 130° Fahr. In coating with albumen, the presence of dust or air-bubbles must be guarded against as much as possible, and the albumen mixture must in all cases be strained through a double thickness of fine muslin just previous to its being used. The albumen mixture which drains off from one plate may be used to coat a second one; but as it becomes slightly diluted with the moisture of the plates, it is advisable not to use it for a third, nor to mix more of the iodized albumen and sugar solution than can be used in one day. The plates, when dry, may be excited at once, or stowed away in plate-boxes for use, as in this condition they have been kept for six months, and I see no reason why they should not keep for as many years, provided they are thoroughly screened from damp and chemical fumes.

Exciting the Albumen Coating.

Prior to the plates being excited they must be completely dry and free from dust; then, having taken a dipping-bath large enough to hold the plate, a sufficient quantity of the albumen bath solution must be filtered to fill it. The plate is now lowered into it with one steady downward movement and allowed to remain one minute; then taken out and the excess of the bath solution drained off. It is now placed on a levelling-stand (albumen surface uppermost) and a stream of water allowed to fall on it from a tap for at least two minutes, as we have to wash off every particle of the bath solution, which appears to adhere with such tenacity as to take considerable force to remove it. When the plate is thoroughly washed, lean it against the wall of the dark room to dry, and when perfectly dry, *but not till then*, it is ready for exposure in the camera. Of course it will be quite understood, that from the time the plate is collodionized, white light cannot be allowed to fall on it; the operations and the after development being performed in a room entirely shielded against the intrusion of white light.

Exposure in the Camera.

This operation may take place as soon as the plate is perfectly dry, or may be deferred for a fortnight. The time of exposure in the camera depends on so many conditions that it is impossible to give exact data. The stereoscopic specimens I now exhibit were taken with a Horne and Thornthwaite's stereoscopic lens, having a $\frac{3}{8}$-in. diaphragm, in forty seconds. With one of their landscape lenses of 14 in. focus and $\frac{1}{2}$-in. diaphragm, producing 9×7 pictures, the time of exposure in good light would be one and a half minute, or if the object is in deep shade, three minutes would be required; but at all times, expose for the deep shades, and the high lights will not be much influenced by the over-exposure.

Developing the Image.

The plate on being taken into the operating room is placed on a levelling-stand and distilled or filtered rain-water poured over it for half a minute, so as completely to moisten the surface and remove any particles of adherent dust; then drain slightly and pour over its surface, so as to cover every part, a mixture made by adding 1 drachm of silver developing solution to 5 drachms of pyrogallic solution (made as before described). Allow this to remain on for two or three seconds, and afterwards pour on and off repeatedly until the general outline of the picture appears; when this takes place pour off and well wash the plate. Should and stains have occurred, remove them by brushing the surface with a camel's-hair brush. Now mix another quantity of silver developing and pyrogallic solutions in the same proportions as before, and pour this on and off the plate, until the details of the picture are well brought out and the high lights sufficiently intense; on this being accomplished, drain off and thoroughly wash with water. The picture is now ready for the next operation, fixing the image. Should the developing fluid become muddy pour it off, well wash the plate, and continue the development with fresh solutions made as before. If the picture begins to develope in less than one minute after applying the developing mixture, drain the plate completely, well wash with water, and continue the development with a mixture containing only half the quantity of silver developing solution; or should no appearance of the picture take plate after two minutes' application of the developing mixture, use equal parts of silver developing and pyrogallic solutions. In general a good picture takes five minutes to develope, and the condition of the sky will serve to indicate whether the proper amount of exposure has been given. An under-exposed picture has a dense sky, but the details in the deep shades are deficient; whereas in an over-exposed picture the details are well out, but the sky is transparent and generally of a reddish tint; such pictures moreover possessing no contrasts of light and shade; whereas when the proper amount of exposure has been given, the sky is perfectly opaque, the middle tints finely developed, and the details apparent in the deepest shades with perfect contrasts of light and shade: as an example I refer you to the photograph of the mortar in St. James's Park. I cannot pass on to the next step without giving a caution against the use of imperfectly cleaned measures and vessels to contain the developing fluid; these are constant causes of failure, and must be carefully avoided.

Fixing the Image.

The plate, having been thoroughly freed from the developing fluid by washing, is placed on the levelling-stand and the surface covered with fixing solution. In a minute or two the yellow opalescent color of the film will disappear; and when this occurs, well wash with water and examine the picture in good day light, to ascertain if a thin film of silver has been formed on the surface during the development, as this formation frequently happens; if so, it must be removed. This, however, is easily done by friction with a camel's-hair brush and a stream of water. Lastly, lean the plate against the wall to drain and dry; when dry, it may be varnished with crystal varnish in the usual manner.

Having thus given such details as I hope will enable any one to follow out this process with every chance of success, I think I cannot conclude without saying a few words on the failures that have occurred to myself and others in following the directions as originally published, and afterwards giving my explanation of their causes and the remedies I adopt to prevent their recurrence. The failures are,—1st, fogging of the collodion film; 2nd, fogging of the albumen coating; 3rd, blistering of the albumen coating, 4th, stains during developments, and 5th, minute holes in the skies. The great cause of the fogging of the collodion film arises from the presence of sub-salts of silver in the collodion bath, which will exert their baneful influence, although acid may be added to prevent it; these subsalts are formed by decomposition in the process of manufacture of nitrate of silver, and have been present (in minute quantities) in every sample I have examined for the last twelve months. I have found that on adding a solution of carbonate of soda to a nitrate of silver solution, containing a small quantity of a subsalt, that the nitrate is left untouched until the whole of the subsalt is converted into carbonate of silver. For this reason I add carbonate of soda to the bath solution to convert the whole of this deleterious agent into carbonate, and then I decompose this carbonate into nitrate of silver by the addition of nitric acid. A solution is thus obtained free from any subsalt, and when slightly acidified, as before described, yields pictures free

from fogging, provided the collodion used is not alkaline. This I avoid by adding the tincture of iodine, for it is a fact beyond dispute that an alkaline collodion will yield foggy pictures although excited in a very acid bath.

Fogging of the albumen coating was for some time a source of annoyance; but I found it to be caused by the constant tendency which the iodized albumen possesses to become alkaline. This is prevented by adding an acidified sugar solution to it just prior to coating the plate. Fogging may also be caused by the collodion and albumen baths becoming alkaline; the mode of remedying this has been already given. The use of impure samples of kaolin, containing carbonates, often causes the albumen bath to lose its acidity; to avoid which I always steep the kaolin employed in common vinegar, and then well wash it with water previous to adding it to the bath solution.

Blistering of albumen coating is one of the most serious failures that can occur, but this I have entirely overcome. This blistering arises from an imperfect union of the collodion with the albumen, as the latter, on being wetted in developing, expands and forms the blisters; allowing the developing fluid to enter and produce star-like stains. These are avoided by using a collodion which, on being excited, yields a rich creamy film, the tenacity of which is not too great, and with a surface possessing a microscopic roughness. These conditions are obtained by adding glycerine in minute quantities to the iodized collodion, which not only produces these effects, but, by altering the mechanical condition of the film, increases its sensibility; for I view the collodion merely as a vehicle for the iodide of silver, and am convinced that the mechanical condition of the iodide of silver governs its sensibility. I have always noticed that a film which appears smooth, when examined microscopically, is far less sensitive to light than one having a rough appearance. Collodion frequently yields this microscopically rough film without any additions; but this property being as frequently absent, the addition of glycerine is always to be recommended, as it has the power of breaking up the otherwise close texture of the iodide. This rough surface is also essential to prevent blistering, as the albumen enters between, and is bound close to, the collodion coating, and retains it in such a condition that it is highly sensitive to light. Another cause of blistering is the use of albumen obtained from stale eggs; but this is easily remedied by using none but those newly laid.

Stains appearing during the development occur when the washings are imperfectly performed, and are often a source of annoyance to amateurs, I therefore would recommend very great care to be taken that this part of the operation is thoroughly attended to, and you must be free from failures arising from this cause.

Minute holes in the skies arise from dust falling on the plates during their preparation, or from the use of a stronger solution of hyposulphite of soda for fixing than I have advised. This defect is easily remedied: but if it exists, its presence is hardly a grievance, as these orifices are so small as not to be produced in the positive proofs.

In conclusion I may remark, that the plan here recommended is such as may be used by the amateur on first trying this process, and is the same as employed by me in taking the specimens before you. Various modifications may be made; such as using less acid baths and more neutral collodion, so as to lessen the time of exposure; but I have preferred to give such proportions as would render success certain; for we all know that the more rapid a process is made, the more difficult it becomes. To the amateur, therefore, I would say, follow the plan I have given until you have mastered any difficulties that may occur, and can with certainty produce a picture; then, and *not till then*, decrease the amount of acidity in the various solutions, if a less amount of exposure is found desirable. Should any cause of disappointment arise which I have failed to notice, a letter addressed to me at Messrs. Horne and Thornthwaite, 123 Newgate Street, London, will be answered in the course of a post or two.

Sulphate.—A saline compound of sulphuric acid with a base.

From the Jour. of the Phot. Soc.

THE OXYMEL PROCESS.

To the Editor of the Photographic Journal:

Sir,—In the last Number, Mr. Hardwhich asks me to communicate to the Society the exact method in which the oxymel I use has been prepared.

It has been made, as advised in the London Pharmacopæia, by the addition of an eighth part of Beaufoy's acetic acid to honey and water made hot and carefully skimmed.

The specific gravity of this preparation will be about 1·300, and the addition of the water which I should recommend will reduce the density of the syrup bath to a specific gravity of about 1·050.

I may observe, however, that I have purchased oxymel both in London and Bristol prepared without any peculiar care—merely the preparation sold in the shops for medical purposes,—and I have always succeeded well with such samples.

Mr. Hardwhich complains of the want of sensibility in the oxymel process, and this unquestionably is its great defect. I, however, much doubt whether any really efficient preservative process will ever be a quick one.

That on collodio-albumen of Dr. Taupenot is, I believe, supposed to be the quickest at present known. I have studied it, as detailed by Mr. Ackland in Messrs. Horne and Thornthwaite's 'guide to photography', and I find there the necessary time of exposure for lenses with various focal lengths; for example, it is stated, that a landscape lens of 16-inch focus, and with a diaphragm of half an inch, will require in the ordinary sunshine of a summer's day $8\frac{1}{4}$ minutes.

This time is certainly amply sufficient for the production of an oxymel picture; and viewing the process by this standard of comparison, its slowness of action will not appear in so strong a light.

The second difficulty which Mr. Hardwhich speaks of, is a want of intensity in the negatives produced.

I scarcely know how to answer this objection, as I have not met with it in my own practice. My oxymel picturss are not wanting in this respect. I may say the average are quite as deep as those made on ordinary collodion.

In the development of the picture, it must be borne in mind, that no long maceration in water, or exposure to the vapor of steam, is required; and this distinguishes the process, favorably, from that of Dr. Mansell, to which in other respects it nearly approaches.

I have tried a plate, one half of which was washed for 10 minutes, and the other half for only a few seconds, and found the whole picture appear evenly, without any line of demarcation to show which portion had been longest washed. This is undoubtedly a great advantage belonging to the use of oxymel.

Washing for a moment is desirable, only for the purpose of moistening the syrup film and enabling the pyrogallic solution to flow evenly over it. It must not be forgotton, that it is absolutely necessary to use nitrate of silver, liberally added to the developing solution. The operator may begin with about three drops to the drachm, and if the image appears slowly, a little more silver may often be added with advantage, before the pyrogallic acid is changed. If the time in the camera has been rightly determined, the first application will generally suffice. If, on the other hand, the time has been to short, no amount of pressing will avail; while if the picture be solarized by over-exposure, and be weak from that cause, it may readily be darkened to any extent by setting it with cyanide of potassium, as advised in Mr. Hardwhich's, 'Photographic Chemistry,' and then applying a fresh dose of pyrogallic acid and silver. The negatives produced in this manner lose their brilliancy of appearance, but they are of an intense character and print well.

I have long wished that a committee of competent persons could be formed, to whose judgement new processes might be referred, and by whom they might be efficiently tested.

If any such tribunal existed it would save the public much disappointment; and for my part, I should gladly exhibit the method of manipulation which I follow, and the results which I

have secured; and I may observe, in conclusion, that when in London in the spring of this year, I took every opportunity in my power of showing to my brother photographers a process which I still believe to possess many advantages, in easiness of manipulation and certainty and beauty of its results.

I am, Sir, yours faithfully,

J. D. Llewelyn.

NOTES OF A TRIP TO EUROPE.—NO. 8.

Friend Snelling,—In my last I spoke of my impressions upon finding myself actually within the walls of Rome; Eternal Rome! I also mentioned my visit to St. Peters, after leaving which I entered the adjoining Palace of the Vatican, wherein are collected treasures of art of countless value. The foundation of the building is of early origin, and from time to time it has been added to, until it has become of great extent, covering acres, and if its five thousand rooms and galleries where in one direct line, it would reach for miles; but what is the edifice when we think of the glorious works of art therein contained—the mighty works of Michael Angelo that adorn the Listine Chappel—the incomparable productions of the divine Raphael and a host of others whose names are buried in oblivion, but their works still stand, challenging the admiration of the world, conspicuous amongst which is the Laocoon; the heart thrills with sympathy as one beholds the agonies of father and sons—the powerfully convulsed muscles of the one contrasted with the delicate and enfeebled limbs of the other—and it is with a feeling of relief the beholder turns from this exciting group to gaze upon the faultless proportions of the Apollo Belvidere, the *chef d'œuvre* of the world. I again and again turned to look upon this wonderful production of human handiwork—

"The shaft hath just been shot—the arrow bright
With an immortal's vengeance; in his eye
And nostril beautiful disdain; and might
And majesty flash their full lightning by,
Developing in that one glance, the Deity."

I wandered on from gallery to gallery, gazing first upon the works of one age then upon those of another, until the mind was completely overcome with the vast amount brought to view, but I could not leave this renowned building without paying a visit to the studio of the manufactory of mosaics—where are brought into existence those rare works which decorate St. Peter's, the production of many of which were the labor of fifteen or twenty years—besides the collection of the vatican, there is another large public display in the capitol—which building occupies the Captoline Hill. It was designed by Angelo—there are many rare works of art in this collection, both on account of their antiquity and their excellence; the hall of busts is extremely valuable on account of containing likenesses of many who have flourished in the past history of the world; but one of the great attractions is the far-famed Venus of the Capital, the rival of the Venus de Medici. It is a most beautiful model and graceful in attitude, and in many respects I think it superior to the Venus of the Tribune—but the crowning glory of the display is the Dying Gladiator. View it from what point you will, it presents unveiled beauties; in attitude and expression it is marvellous; behold those well-formed limbs, whose anatomy is pronounced perfect, watch the relaxation of the muscles as his strength fails. We contemplate his position with feelings of sadness, forgetting that it is but marble; the heart beats quickly as we gaze upon it, we see the life-blood trickling from the mortal wound, and momentarily we expect to see that strong arm relax, and the heart cease to beat. What to him are the shouts of the victor now? His thoughts are far away with those loved ones he ne'er shall see again; the eye grows dim, the heart gives one convulsive throb, and all is over. I have viewed the Venus de Medici with feelings of intense admiration. I stood before the Laocoon and shuddered at its pictured agony; I have dwelt upon the matchless perfection of the god-like Apollo, but never has work of Art so completely absorbed my feelings as did the Dying Gladiator.

"I see before me the Gladiator lie,
He leans upon his hand—his manly brow
Consents to death, but conquers agony,
And his droop'd head sinks gradually low,—
And through his side the last drops, ebbing slow
From the red gash, fall heavy, one by one,
Like the first of a thunder shower; and now
The arena swims around him—he is gone,
Ere ceased the inhuman shout, which hailed the wretch who won."

After getting through with the public galleries, I visited some of the private collections—the most noted of which are the Borghese, the Barberini, and the Corsini galleries—either of which would be a treasure of Art outside of Rome—then there is much to be seen in the studios of the artists of the present day. I visited a number of them, amongst which were several Americans, the most renowned of whom is Crawford—a man of true genius—as all must acknowledge who wander amidst the beautiful creations of his master mind, which are to be seen in his study in every stage of progression; and as I beheld these exquisite works, I could not help but feel proud to think that he was from my own country. Among the many pleasures I enjoyed while in the "Eternal city," I must not forget to mention my visit to the rooms of Mr. Anderson the Photographist, to whose kindness I am much indebted. I found him busily laboring in the Photographic Art—with enthusiasm—and with what success, his many beautiful views of Rome speak for themselves; in fact I consider his architectural views and interiors the finest in Europe. There is a clearness and brilliancy about them beyond the works of any other Artist I meet with, and one need but look upon such works as these copies of the works of antiquity to perceive the incalculable value of photogrophy, and as it is a subject that will interest most of your readers, I would state that he works the albumen process—using albumenized paper for the positives. I brought home with me a large collection which I shall be happy to show to any of the fraternity at all times, for "a thing of beauty is a joy forever." Before leaving Rome I visited many of the surrounding scenes, and made a number of sketches. One day I spent on an excursion to Lisoli which is eighteen miles from the city. The great object of attraction is the falls and the beautiful temple of the Sybile; as I rode across the Champagna I longed for the camera to carry off many a picturesque ruin that presented itself; but I had to be satisfied with the less accurate works of the pencil—yet amidst all these captivating scenes the hours sped on, and before I was aware of it, I found my allotted time drawing to a close; so settling up some matters of business, I concluded to spend the few remaining hours of my stay in paying a farewell visit to the ancient portions of the city. I strolled down the Corso, taking a last peep at the Cafe's and their inmates; continuing my way through some by-streets, I found myself in the Forum of Trojan, whose massive fragments tell of the splendor of the past,—there stands the beautiful column of Trojan, one of the finest productions of its kind in existence. It was erected by the Roman people in honor of his victories. It is of white marble, and is covered with sculpture from its base to the summit, representing his campaigns; it is in fine preservation. The top is reached by a flight of steps within; it was originally surmounted by a statue of the emperor, but it is now marred by one of St. Peter. 'Tis greatly to be regretted that a stray shot from the French, when they bombarded Rome, did not quietly remove his Saintship from so unsuitable a position. After leaving the Forum, I soon came upon the Marmetine Prison, which is situated at the base of the Captoline Hill; over the dungeon is erected a small church, I entered and was shown into the apartment below; they are two stories in depth, the lower one being evident from the manner of construction of very early date. It is here that it is stated St. Peter was imprisoned, and from its position we have no reason to doubt the fact, it is dismal enough; the only air and light it receives being from a circular aperture in the ceiling leading into the room above. In the middle of the floor is a spring which the jolly-faced friar in attendance informed me, burst forth spontaneously, so that the saint might baptize the jailers. Being dry, I asked permission to take a drink which was granted, and the reverend father opened his eyes in astonishment, when I informed him that I

thought it was miserable stuff for a beverage, whatever might be its baptismal qualities. After leaving the prison I visited the dreaded Tarpean Rock, but my eyes did not grow dim at the sight, whatever might have been its terrors for criminals in days gone by. I retraced my steps and entered the Forum—yes, the Forum of ancient Rome,—what a spot for reflection! every fallen column and ruined arch speaking of the past.

> "Romans, look round you—in this sacred place,
> Where once stood shrines, and gods, and god-like men;
> What see you now? what solitary trace
> Is left of all, that made Rome's glory then?"

I walked beneath the temples erected to commemorate great deeds and great men—but where are they? gone, and with them departed the glory of Rome. There is the Arch of Septimus Serenus, with its elaborate ornaments time-worn and disfigured, and near by stands the column which Byron has immortalized as the "nameless column with the buried base." Since then it has been excavated at the expense of the Dutchess of Devonshire—and now claims both a base and a name. It was erected about the year A.D. 600, to the Emperor Phocas; on all sides are mighty ruins; to the left may be seen temple after temple; some mere shapeless heaps of rubbish, while others are built into more modern structures. In front is the plain of the Forum, which has oft resounded to the shouts of victorious armies: now alas! cluttered up with filth, and echoing the poetic sound of a cattle market—while to the right upon the Palatine Hill once stood the Palace of the Cæsars, now a mighty mass of choked-up ruins, partially overgrown and covered with ivy. I passed along the Sacra beneath the Arch of Titus, whose sculptured panels tell of the conqueror of Jerusalem. But my mind was soon drawn from all these to the superb scene before me: upon one side stands the Arch of Constantine, upon the other the ruins of the temple of Venus and Rome, while directly in front arose the gigantic form of the Colisseum, arch above arch, sinking the surrounding objects into insignificance by its stupendous proportions. As I neared its base, my mind was filled with wonder at the sight before me: I entered beneath its massive portals, and stood within the arena with feelings I cannot describe; veneration, awe and piety, mingled together, as I recalled the history of the spot where I stood, and thought of the scenes of cruelty those walls have witnessed—the remembrance of which makes the blood creep in one's veins. I clambered up the grass-covered steps, higher and higher, until I stood upon the summit; then, and not till then, did I comprehend the vast proportions of this mighty edifice. The scene was one of grandeur, one which I feel myself entirely inadequate to describe. I shall never forget the beauty of that night. The sun was just sinking beneath the horizon, his parting rays lingering upon a few rosy clouds, while the mist of evening was slowly rising upon the Campagna; while here and there an edifice or ruin caught the light of departing day. The massive ruins upon which I stood were fast falling into shadow, while here and there a few golden lights trembled upon its lofty arches. The faint sound of the evening reveille of the soldiers quartered upon the Palatine, stole upon the ear like the "soft exquisite music of a dream," the twilight deepened and all became massed in shadow, while I groped my way down in the darkness of approaching night.

> "Here, where the Roman-millions blamed or praised,
> Was death or life, the plaything of a crowd,
> My voice sounds much, and fall the star's faint rays
> On the arena void—seats crushed—wall's bow'd—
> And galleries, where my steps seem echoes strangely loud."

Thus closed the last eve of my stay in "Imperial Rome," but ever in memory will dwell the recollections of her gorgeous works of Art, her glorious temples and mighty ruins.

F. D. B. Richards.

Cyanogen.—A colorless gas composed of carbon and nitrogen, and possessing a pungent and peculiar odor. Water absorbs nearly five times its bulk of cyanogen at 60°; alcohol about 23; with hydrogen it forms hydrocyanic acid and with the metals cyanides or cyanurets.

THE HONEY PROCESS.

To the Editor of the Photographic Journal:

Lower Road, Islington, Aug. 7, 1856.

Sir,—Having, like your correspondent in last month's Journal, been much troubled by *markings* on the honey plates, but having now completely overcome these obstacles to success, I beg to give him, as well as many others in the same predicament, the benefit of my experience.

I have tried every suggestion on the honey process, and the only method of manipulation I find to succeed in the following:—

Provide yourself with three vertical baths, the more capacious the better:—1st. The nitrate bath. The plates should be dipped into this bath rather more speedily than for the ordinary negative, otherwise marks will be left which are very likely to be ascribed to unwashed-off honey: it appears that unless the iodide of silver be well embodied in the collodion, it is liable to be washed off in the repeated operations.

2ndly. The washing bath. Fresh water should be provided for every plate, from which it should not be removed until the water flows evenly over it. The New River water answers admirably, at least it always has done so excepting the last two or three days in July and the commencement of this month, when owing to the heat of the weather I found it impossible to get a picture, the pyrogallic solution becoming decomposed immediately it was spread on the plate, although it was dissolved in undiluted acetic acid (not glacial). This phenomenon did not occur with distilled water, but it required the same strength of acid to prevent it. For the unwashed plate one eighth acid was sufficient.

For this bath I use a skeleton dipper, made by bending a glass rod to the required shape; the advantage is, that the nitrate gets more completely washed off the back of the plate, thus preventing the next bath from being so quickly contaminated.

3dly. The honey bath. Dissolve two lbs. of honey in two pints of water, then add the whites of two or three eggs well beaten up; place it on the fire until the albumen becomes coagulated, it will then run rapidly and bright through a linen filter; then add acetic acid,—I use an eighth (not glacial). The addition of acetic acid is considered to add keeping properties to the honey solution, and it certainly facilitates the after-removal of the honey.

To those who prefer a neutral solution I advised a portion of common chalk to be digested in the honey solution a day or two previously to its clarification. In either case the commonest description of honey will answer as well as the best.

For removing the honey after exposure I prefer saving the water used for washing off the nitrate from the last plate, and continue to use it for as many plates as require developing.

The photographic world is much indebted to Mr. Shadbolt for the the introduction of honey as an outdoor agent, and for rapidity of management I cannot think it will ever be excelled. By the process now given ten or a dozen plates are easily excited within an hour.

I am not prepared to say what proportion of honey or acetic acid is best, but finding what I have stated give good results I am content. I remain Sir,

Your obedient servant,

Thomas A. Barber.

The spotted appearance which seems almost inseparable from the keeping process being due wholly to dust will, I have no doubt, some day give way to mechanical appliance.

From La Lumiere.

ETHER.

Extract from M. A. Cahour's *Lessons in Chemistry.*

Pure ether is a very unstable liquid possessing a strong and penetrating odor; it boils at 35°. Its density is from 0·73 to 12 degrees. The density of its vapor is equal to 2,565. It is highly combustible by introducing it in the vapor state into a flask containing oxygen; compounds are formed which explode

with violence on the approach of any ignited body. Great care therefore is necessary in the management of ether, while working in a place containing combustible substances.

When mixed with its volume of concentrated sulphuric acid, the liquid heats very perceptibly. If water be added, the whole dissolves, and the liquid then only contains sulphovinic. Chlorine acting on ether gives a series of products derived by substitution, whose composition may be expressed by the formulas.

$$C_4H_4ClO, \text{ or } C_4H_3Cl_2O, \text{ or } C_4H_2Cl_3O_2 \text{ or } C_4HCl_4O_2, \text{ or } C_4Cl_5O.$$

Ether is employed in chemical laboratories for dissolving greasy substances, oils, resins, etc. The theory of etherification is rather complex. If a somewhat large quantity of alcohol be mixed with a little sulphuric acid, the compound commences to boil at about 80°, and only distils alcohol. The temperature soon increases and attains 115 to 120 degrees: it then commences to distil ether, but a large amount of alcohol still passes. When, lastly, the temperature reaches 130 to 140 degrees ether and water alone passes, the ether resulting from the decomposition of the sulphovinic acid, whilst the water arises from the decomposition of the hydrate of sulphuric acid which is formed. It was first thought that the transformation of alcohol into ether under the influence of sulphuric acid, was owing to the affinities of the latter for water, which seizes on that substance and sets the ether free, the latter being in the highest degree volatile. When afterwards it was observed that the same quantity of sulphuric acid might be used indefinitely, so to speak, in transforming alcohol into ether, and that, moreover, the separation of this product was accompanied by the disengagement of steam corresponding in quantity, to what would be necessary to reproduce the alcohol used in the experiment, it came to be understood that etherification was a simple phenomenon by contact, the part played by the sulphuric acid being confined to the effecting of the separation of the alcohol into ether and water. What most proves also that the formation of ether cannot be considered as the result of a dehydration of alcohol effected by sulphuric acid, are the curious experiments of Mr. Graham, which demonstrate that sulphuric acid diluted with several times its volume of water, will still effect the conversion of alcohol into ether if submitted to a sufficiently high temperature. The question was left in this state, when Mr. Williamson, through may ingenious experiments, demonstrated that the continued production of ether under the influence of a limited quantity of sulphuric acid is the result of two successive double decompositions; one, taking place between 1 molecule of sulphuric and 1 molecule of alcohol, gives little to sulphovinic acid and water; the second taking place between this sulphovinic acid and one fresh molecule of alcohol, produces ether and reproduces sulphuric acid.

These two phases of the operation may be expressed by the following equations:—

$$1st\ Phase,\ S_2O_6\left\{\begin{matrix}HO\\HO\end{matrix}\right. + \begin{matrix}C_4H_5O\\HO\end{matrix} = S_2O_6\left\{\begin{matrix}C_4H_5O,\\HO\end{matrix}\right. + 2HO$$

$$2nd\ Phase,\ S_2O_6\left\{\begin{matrix}C_4H_5O\\HO\end{matrix}\right. + \begin{matrix}C_4H_5O\\HO\end{matrix} = S_2O_6\left\{\begin{matrix}HO\\HO\end{matrix}\right. + \begin{matrix}C_4H_5O\\C_4H_5O\end{matrix}$$

Sulphuric acid thus produced, reproduces by contact with a fresh molecule of alcohol, a second molecule of ether, so that gradually the alcohol becomes totally converted into ether.

This theory of etherification does not rest on gratuitous hypothesis; it is the result of experiment. Mr. Williamson having prepared some sulphovenic acid and having caused it to react on pure alcohol, was enabled to convince himself of the transformation of the latter into ether, placing himself in circumstances analogous to those under which this substance is produced. In this view of the case there exists between alcohol and ether one of the simplest of relations, which we also hereafter observe between the hydrated acids and the same acids in the anhydrous state.

From the Journal of the Phot. Soc.

TAUPENOT'S PROCESS.

To the Editor of the Photographic Journal:

Neath, August 15th, 1856.

Sir,— After many experiments I have at last succeeded in obtaining satisfactory results from a modification of Dr. Taupenot's process, which I transcribe in the hope that some of your readers will make trial and report of it.

I enclose herewith a negative taken this morning (a very far from favorable one here) with an exposure of one minute, with a 2½-inch Ross and ¼-inch stop on a plate sensitized on the 13th. I have reduced its dimensions to save weight and risk of breakage per post, but it will show you the general result as to tone and quality which I am able to obtain. I should add that the collodion used upon it is Thomas' and has been sensitized since July last year.

Process.—Mix together 3 parts of albumen and one part pure honey, adding sufficient yeast to cause fermentation as recommended by Dr. Taupenot. When fermentation has ceased, add to each ounce of the mixture 10 grains of bromide of calcium, dissolve in just so much water as is required for its solution, and filter.

In other respects proceed as recommended by Dr. Taupenot's, save that the same bath used for the collodionized plate may also be used again (without acetic acid) for the second immersion when the albuminized plate is required to be sensitized.

A little kaolin, occasionally shaken up in the bottle containing the nitrate bath, when there is any discoloration, and a crystal or two of nitrate of silver, is all that is necessary to maintain the efficiency of it in working.

Thorough washing after each bath is absolutely necessary to avoid clouding.

The plates should not be dried by heat, but simply drained dry on blotting-paper.

I am, Sir,
Your obedient Servant,
Egbert Moxham.

P. S. In plates exposed for a short time only, the development is much longer in *commencing* than in others, but it afterwards proceeds with the same rapidity. I use pyrogallic acid to commence with, and afterwards the same with some of the nitrate bath mixed.

From La Lumiere.

ALCOHOL.

Extract from M. A. Cahours *Lessons in Chemistry.*

By continuing the action of chlorine or bromine, we obtain *choral* or *bromal* represented by the formulas.

$$C_4HCl_3O_2 \text{ and } C_4HBr_3O_2.$$

Which as is seen comes from aldehyde by the substitution of three molecules of chlorine or bromine for three molecules of hydrogen. Iodide should give like results, yet iodal is unknown.

On dropping a globule of potassium or sodium into anhydrous alcohol, a very lively reaction takes place, and an abundant disengagement of hydrogen gas is observed. On cooling we obtain a crystallized colorless mass, differing only from normal alcohol in its composition in that 1 equivalent of potassium is substituted for 1 equivalent of hydrogen. These reactions may be expressed by the following equations.

$$C_4H_6O_2+K=C_4H_5KO_2+H$$
$$C_4H_6O_2+Na=C_4H_5NaO_2+H.$$

Alcohol has great affinity for water, and when mixed with this liquid emits a slight heat. Mixed on the contrary with snow or ice broken up, cold is produced.

On mixing for instance, anhydrous alcohol at zero with snow at zero, the temperature may be lowered 37 degrees, if the quantity of snow employed somewhat exceed what the alcohol can melt.

On mixing alcohol with water, a contraction takes place which gradually augments, until the mixture finds itself composed of 100 parts of alcohol and 116·23 parts of water, corresponding to a hydrate represented by

$$C_4H_6O_2+6HO.$$

When diluted alcohol is submitted to distillation, the first products condensed are always richer in alcohol, and the temperature gradually rises to the point at which the liquid boils.

The acids exercise a remarkable action on alcohol, which demands our attention. Alcohol dissolves almost all the acids, and from their mutual reaction may result three different products. Sometimes it loses half its water and is converted into ether. This is the action of sulphuric, phosphoric acid, etc. Sometimes the acid unites with the ether to form neutral compounds. Examples: acetic acid, oxalic and benzoic acid, etc. Lastly the acid may unite with the ether to form compound acids. Sulphuric and phosphoric acid act in this way. If the acid yields oxygen readily as chloric acid, chromic acid, etc., the alcohol is destroyed and transformed into other more simple products.

Alcohol and the acids give birth by simple mixture, to very curious results.

Concentrated sulphuric acid mixed with pure alcohol, does not act on any neutral carbonate, on the other hand, it decomposes very readily acetate of potash. Hydrochloric acid dissolved in alcohol, does not act on carbonate of potash, but decomposes, on the contrary, the carbonates of soda, strontian and lime, very readily.

Acetic and tartric acids dissolved in alcohol, do not decompose a carbonate. Until the present time we have been unable to get any satisfactory explanation of these facts.

Alcohol dissolves the hydrates of potash and soda; under the influence of heat alcohol changes; towards 210 to 226 degrees, hydrogen is freed, whilst an alkaline acetate remains. The following equation explains this reaction:—

$$C_4H_6O_2+KO,\ HO=C_4H_3O_3,\ KO+4H.$$

Alcohol dissolves the alkaline and terreous sulphates.

The chlorides, bromides, iodides, etc., dissolve generally in alcohol, and form with the latter definite and crystallizable combination.

Alcohol also unites with many salts, and forms crystallizable combinations, in which it appears to play the part of crystallization water.

From the Jour. of the Phot. Soc.

ON COLORING COLLODION POSITIVES.

To the Editor of the Photographic Journal:

New Road, Spalding, Sept. 12, 1856.

Sir,—I believe the great difficulty experienced by most photographers in coloring glass positives, is in being unable to get a sufficient brilliancy and depth of color in clouds and drapery, the former especially generally being represented by flat strokes of color without reference to form: the shape of clouds should be as easily discerned as any local object. This may, in a great measure, be owing to the impossibility of going over the picture after the first coat of color has been laid on, any after attempt taking off the touch and rendering the surface too polished for any dust-color to adhere. The best substance I have found to form a ground on which colors of this kind work well, is gelatine. I use it in the following manner:—Take four grains of pure gelatine, and cover with water for a quarter of an hour, then pour off, and add 2 ounces of hot water, when the gelatine will immediately dissolve; while hot, pour over as many plates as you intend to finish, and dry. More gelatine might be used with advantage under some circumstances, without injury to the picture.

In putting in backgrounds, a great improvement will be found in having a fine needle and a pin mounted in suitable holders, for the purpose of sketching in parts of the foreground and buildings, to be afterwards judiciously touched with water-colors. A minuteness and finish is thus imparted to the picture, not to be attained in any other manner.

I am, Sir, yours respectfully,

John Titterton.

From La Lumiere.

ALBUMEN.

This substance exists under two distinct forms; liquid, as found in the fluids of the animal economy, solid and insoluble as in the white of boiled eggs.

Albumen is found in a state of solution in blood, combined, perhaps, with soda; by adding acetic acid, however, to the serum to saturate the alkali, it does not precipitate albumen.

Albumen also exists in the whites of eggs, but it seems to be different from that contained in the serum, and, in fact, though the latter is neither coagulated by ether or the essence of turpentine, it is completely otherwise with the former.

It is also met with in chyle, in the lymph, in the amniotic fluid, etc., and the various fluids of the animal economy generally

Evaporated in an exhausted receiver the solutions of albumen abandon this substance in the form of a transparent amorphous and fissured mass, tasteless and of a slightly yellow color.

Albumen begins to coagulate at about 65 degrees, at 75 it is completed; if the solution be very dilute, it does not assume a coherent mass; it simply separates from the flakes which collect on the surface in the form of froth. This property sufficiently accounts for the part which albumen plays in the clarification of liquids of organic nature.

Alcohol coagulates albumen in the manner of heat.

Coagulated albumen, heated in the middle of water in closed tubes to about 150 degrees dissolves, forming a liquid which does not possess the property of coagulation. Submitted to dry distillation, albumen gives, water, carbonate, hydrosulphate, and hydrocyanate of ammonia, and an oil of an infectious odor, which contains ammoniacal bases; we obtain besides as residum, an abundant deposit of a cavernous and brilliant coal.

Left to itself, albumen decomposes spontaneously giving divers products; it also emits that repulsive smell observed in the fermentation of animal substances.

Some acids form with albumen quite insoluble combinations, as metaphosphoric, azotic, and sulphuric acids.

Concentrated hydrochloric acid dissolves albumen, developing that highly characteristic violet blue color.

A concentrated solution of potash or soda forms a combination with albumen presenting the appearance of jelly, and completely dissolves in pure water. Heated with a solution of these alkalies, it frees ammonia, and acid compounds are produced which remain united to the alkaline matter. By the addition of a small quantity of alkaline matter, albumen acquires the characteristics of caseine.

Baryta, strontian and lime, form with this substance insoluble compounds, which on drying, acquire a hardness comparable to stone.

On applying the poles of a battery to the white of an egg containing a considerable quantity of sea salt, the latter decomposes. From it results hydrochloric acid which unites to the positive pole, and soda which forms on the negative pole with albumen, a gelatinous combination analagous to mucus.

On mixing albumen with certain metallic salts, and then adding a quantity of potash larger than what would be necessary to decompose the salt, the oxide forms a soluble combination with albumen: Example—salts of iron or copper with albumen or potash.

With bichloride of mercury, albumen forms a perfectly insoluble combination. Albumen is therefore the best antidote against corrosive sublimate.

Yellow prussiate of potash immediately gives white precipitate in the solution of albumen in the acid liquids; if the liquid is alkaline, the precipitate would only make its appearance after neutralization.

The infusion of gall nuts abundantly precipitates albumen from its aqueous solution.

Albumen evaporated in an exhausted receiver and carried to the dry state, may be kept at 100 degrees, and will afterwards dissolve completely in water.

When alkaline albumen is left to itself it decomposes, emits a fœtid odor, and the whole mass becomes filled with animalculæ. If we slightly acidulate the liquid, a large number of rounded atoms, which constitute the first rudiments of a vegetable known by the name of the *penicillium glaucum*, will make their appearance.

Coagulated and soluble albumen possesees exactly the same eomposition; it is probably an isomeric modification. It possesses besides, the same compositiou as fibrin, and like it may be represented by the formula—

$$C_{48}H\ AZGO_{16}.$$

Albumen is found not only in animals but also in plants. Its composition and properties are identical with those of animal albumen.

Albumen may be procured by beating the white of au egg in a mortar with water and filtering the solution; the albumen is thus separated from the membranes which accompany it, the filtered liquid is precipitated by alcohol; then let the deposit digest in ether, which removes the greasy matter.

TRAITE PRATIQUE
de Gravure Heliographique sur Acier et sur Verre.

BY M. NIEPCE DE ST. VICTOR.

This treatise gives a detailed account of the method of heliographic engraving as practised by its author; and its contents are so novel and strikiug, that a summary of them would seem to be the best way of introducing and of recommending the work to the notice of English photographers.

In an unaffected and modest prefacc, M. Nièpce gives a short account of the rise and progress of heliography, or sun-engraving, and of the labors of himself and others to bring it iuto practical working; and he meutions the singular fact, that this discovery, which would seem to be naturally the finishing-point or application of photography, was really its commencement.

The first idea of Joseph Nicéphore Nièpce, his uncle, in 1813, was to reproduce on a metal plate an image in the camera, in order to change it afterwards into an engraved plate.

It is also remarkable, that the first result of the connexion between Nièpce and Daguerre was the utter abandonment of snch project; it was not till after the discovery of the Daguerreotype that the idea was taken up again.

M. Berres and Dr. Donné were the first to change a daguerreotype into an engraved plate, and they obtained satisfactory pictures. M. Fizeau, assisted by M. Hurlimau, obtained after wards more complete results. Then followed Claudet and Grove; but all these operated on the daguerreotype plate. On March 23, 1853, Mr. Fox Talbot published his process of engraving on steel with gelatiue and bichromate of potash, which more nearly resembled M. Nièpce's process. At the same time M. Nièpce de St. Victor aud M. Le Maitre, an old colleague of M. Nièpce the elder, began a series of fresh experiments, substituting steel for tin, and perfecting the composition of the varnish. They were successful; and M. Mante still further improved the proeess by the discovery of a liquid varnish. M. Riffaut, au engraver, has also devoted himself entirely to this new art, and contributed much to its perfection. Many other artists, among whom may be mentioned Negré, Baldus, and Thevenin, have now taken it up, and have produced very fine engravings of all styles and subjects; and it seems rapidly making its way in public estimation.

The first chapter treats of the origiual process of Joseph Nicéphore Nièpce, and though very iuteresting, is not of course now practically useful.

The second chapter enters fully into the influence that the air, light, and different gases have on the bitumens, resius, oils, &c., which are used in the process, as improved and matured by M. Nièpce de St. Victor.

The third chapter describes the method of preparing the varnish; and here the practical part of the treatise begins, and from this point a sketch of the contents of the remaining chapters will be given. To begin theu with

III. *Composition and Preparation of the Heliographic Varnish.*

M. Nicéphore Nièpce composed his varnish with bitumen of Judæa dissolved in essential oil of lavender, and made it up into an unctuous paste, applying it to the plate of metal or glass with a buff. The author first modified this process by usiug a roller iustead of the buff, but found both ways ineffectual for giving a homogeneous coat. He then tried to make a liquid varnish, as it could be applied easily, and would give a coat smooth and homogeneous, both essential requisites with resins and bitumens, he found none so good as the bitumen of Judæa; and as a solvent for the bitumen, benzine with a tenth part of some essential oil, to render the bitumen sensitive to light, and to give it more thinness aud viscidity. All esseutial oils, however, are not proper for the varnish, because they vary in sensitiveness and purity.

The essential oil which gives the most unctuous coat is that of pure undistilled aspic; but the one which gives the most beautiful heliographic results is that of juice of pure citron obtaiued by pressnre. The varnish formed with it is very homogeneous, dries more readily, and is more sensitive to light than the former. The composition of the varnish is as follows:—

Anhydrous benzine	90 grms.
Essential oil of pure citron-juice	10 "
Pure bitumen of Judæa	2 "

To make the benziue dryer, it is sufficient to put some chloride of calcium into the bottle containing it, and leave it there for some time after shaking up the contents together; it can be used forty-eight hours afterwards.

The benziue which contains water does not give a good varnish, as it is *furrowed* all over. The bitumen of Judæa dissolves well in benzine: it is only necessary to shake it from time to time and to let it stand for twenty-four hours, and afterwards to pour it off or filter it, to extract from it auy insoluble matter. It is then quite clear.

This varnish, which is very fluid, has the advantage of giving a thin coat; and the thinuer the coat, the quicker is the effect prodnced by the light, and the better are the half-tints. If in certain operations by contact, a thicker varnish is required, it is enough to leave the bottle containing it uncorcked for some hours; the benzine evaporates rapidly, and the varnish becomes less liquid. If needful, 3 or 4 grms. of bitumen may be added, according to the subject; in proportion to the thickness of the bitumen is the resistance it offers to the aquafortis; but this must be within certain limits, or the half-tints will be lost, aud the varnish will separate from the plate during the action of the solvent. The varnish, when prepared, ought to be kept in a bottle filled up and corked, and should be put away from the light to preserve its normal state, if the component materials have not already been slightly influenced by the air and light; because in this case, their action continuing slowly, after a time the varnish will acquire a sensitiveness which is often more injurious than useful in operating by contact, as will be hereafter explained. It is therefore better to prepare only a small quantity at a time.

IV. *Cleaning the Steel Plate.*

The plate must be perfectly flat, as the first condition in operating by contact; and well polished, which is indispensable in working in the camera-obscura. After leaving the hands of the polisher, or having been used unsuccessively for an engraving, it should be sceured or cleansed with benzine, then rubbed with a buff of cotton wool steeped in alcohol at 40 degrees, and powdered with very fine emery dust, which polishes the plate, and in time

makes the steel plate like a silver plate for the daguerreotype. Plates of zinc, copper, and glass are cleaned with tripoli. When the plate is sufficiently polished, it may be covered again with pewter, or tripoli diluted in rectified alcohol, and left to dry completely before removing the coat. The plate on which the varnish is to be poured being perfectly scoured, and having no signs of dampness, a fine brush should be passed over it to remove the smallest grains of dust and any fibres of cotton which may adhere.

V. *Spreading the Varnish*

This is the most important operation, as the success of the engraving depends on the perfect equality of the thickness of the varnish, and its freedom from grains of dust and small holes, which would occur if the varnish were shaken. In such a case it is useless to proceed; a fresh plate must be taken and a fresh coat spread.

The spreading may of course be done in various ways, and the experienced operator in collodion or albumen will find no difficulty. M. Niepce de St. Victor pursues this plan: — He pours the varnish gently on the centre of the plate, he then spreads it by a movement of the hand over the whole surface, which he inclines so as to pour back the excess of the varnish into the bottle by one of the corners. He next holds the plate straight (always by one corner) to let the varnish flow downwards; then he turns it back again, and leans it on an opposite corner against the wall, inclining it a little to let it dry. This requires only a few minutes, because the benzine and the oil of citron are very volatile and dry readily. The plate need be varnished only a few moments before operating, and as soon as the varnish is dry it must be kept from the light; as, however, it is not very sensitive, it may be spread in diffused light.

VI. *Method of operating by Contact.*

By this is meant the application of an obverse of an engraving or a photographic proof to a varnished plate, and then covering with glass and exposing it to the light. For this operation, the print to be reproduced need not be varnished or waxed. The action of the light will be more or less slow, according to the thickness of the paper, but the result will be better without it.

To reproduce a picture, a photographic copy must be first made of the same size, or reduced, either on paper or albuminized glass, according to the subject. For a picture from nature, as a portrait, or from an oil painting, a positive on thin and white paper gives as good a result as albumenized glass, admitting of less harshness of outline and more half-tints.

The advantage of albumenized glass is, that it can be more quickly reproduced, and gives finer and clearer details. It is therefore better adapted for such subjects as a plan or an engraving. The method of application is the same as in the ordinary photographic printing process. The varnish does not stick at all, and so the glass may be pressed close without risk.

VII. *Exposure to the Light.*

This is never very long, but it varies accordingly to the subject to be reproduced, the intensity of the light, and the sensitiveness of the varnish. On an average, the time does not exceed a quarter of an hour in the sun, and an hour in diffused light. As much sun as possible and dry weather are of course preferable.

VIII. *Composition of the Solvent for developing, and manner of use.*

The solvent operates by removing the varnish from all those parts which have been kept from the action of light, those which have been affected by the light being insoluble. The metal is thus striped of all those parts which correspond to the shadows in the engraving or picture, still preserving all the half-tints.

To remove the solvent, water must be poured on the plate, and it must then be dried. The solvent is composed of—

Oil of naptha rectified	4 parts.
Benzine	1 part.

If the exposure of the plate be too short, the quantity of benzine should be increased; if too long, the naptha should be lessened. The solvent should be applied immediately after the exposure. For small plates, enough may be poured on at once to cover the whole surface; but for large plates, a dish is required in which enough of the solvent is put for the operator to be able to plunge quickly and at once the whole plate into it, so that the whole is covered. It acts with great rapidity, and it is generally necessary to stop its action immediately by washing it off with water. If it removes the varnish, the exposure has been too short; if the image be feebly or not at all developed it has been too long, or the varnish detatch itself in parts, the plate has been damp either before or after spreading it. A coat of varnish too thick will sometimes also attach itself partially. The solvent may be used several times if filtered when it becomes discolored.

IX. *Washing to stop the Action and remove the Solvent.*

This is done by pouring water over the plate in a stream, or by plunging it into a large basinful and shaking it about in it for some seconds; next putting it under a tap of water to wash off completely the solvent, and then removing any drops from the surface with a pair of bellows. To dry the plate, it is exposed to the air or warmed slightly.

X. *Hardening the Varnish by Fumigation.*

After many experiments, M. Niéce found the fumes of oil of aspic or lavender the best for this purpose. The method of using it is as follows: —A box is made like that used in the daguerreotype process, hermetically sealed, having at the bottom a sheet of zinc with a round hole in it. On this opening is fixed a china cup containing pure oil of aspic (not distilled or rectified); this is warmed with a spirit-lamp up to a temperature of from 158° to 170° Fahr. or more; but care must be taken that too much of the essential oil be not evaporated, or the varnish will dissolve and become bronzed or iridescent. It is recommended therefore to warm the oil only so as to cause a slight liberation of vapor, and not to expose the plate to it till the box be full of the fumes, so that they may condense equally on the surface of the varnish. The length of exposure should be 2 or 3 minutes; if this is not enough, a second fumigation may be commenced by warming the same oil afresh. It will not, however, serve for more times. The plate should then be dried by exposing an instant to the air before biting in with aqua-fortis.

XI. *Application of the Graining of Aqua-tint.*

This is indispensable to the reproduction of a photograph representing architecture, landscapes, portraits, or the like; but not for engravings, plans, or linear drawings. The use of the graining is to admit of the plate being inked, which otherwise could only be done imperfectly, because it would not retain enough ink to give a good copper-plate impression.

To apply the graining, put resin finely powdered at the bottom of a box constructed for such purpose, and blow it up with a pair of bellows so as to make a cloud of dust, which is left to resettle on the plate. The plate is then warmed, and the resin forms a network over the whole of the engraving; this consolidates the varnish, which can then resist the longer the corrosive action of the mordant. It forms a graining on the shadows more or less fine according to the fineness of the powder, which retains the printing ink, and gives good and numerous prints after the varnish and the resin have been removed by means of fatty substances warmed, and oils of benzine.

XII. *Biting-in of the plate.*

This should not be attempted untill all the preceeding operations have succeeded perfectly; and the plate should have, after the action of the solvent, the same appearance as it had before its exposure to light, *i. e.* a brilliant and variegated look, without the image being too much *veiled*. By a *veiled* image is meant one which is not quite visible, where the metal is not completely bare in the parts corresponding to the deepest shadows. The method of applying the mordant is as follows;—

After having edged the plate with mastic, and covered again with varnish the parts which ought not to be attacked, as in ordinary engraving with aqua-fortis, water mixed with acetic acid should be poured over the plate, beginning with water to 1 degree and advancing successively to 12 degrees, according

to the resistance of the varnish and the depth required. The water must be changed several times without increasing the quantity of acid. This is necessary to make it attack the metal plate, because it often happens that the aqua-fortis does not bite immediately, especially if the plate has undergone the fumigation of the oil of aspic, which either greases the coat of varnish very much, or hardens it so that the aqua-fortis cannot act. The acid must in this case be made to attack the plate by removeing the water once or twice, and submitting it to contact with the air; or better still, warm water may be poured over the plate before applying the aqua-fortis, but bellows should then be used to remove any drops of water which may remain. M. Riffaut has found wetting with saliva very successful for small plates,

When the biting-in appears sufficient, the action must be stopped with clean water before those parts of the varnish, as, sometimes happens, is crossed and the whites are stained, the fumigations may be ommitted, and a saturated solutions of iodine at a temperature of from 56° to 60° Fahr. used for biting-in; it should be of a yellow gold color. After covering the plate with this solution, it should be renewed every ten minutes, for two or three times, or more, till the plate is sufficiently bitten-in; part combines with the steel and forms iodide of iron, the rest is evaporated. The operation must be finished by the application of weak aqua-fortis, which sinks into the metal more deeply than the iodine, without attacking the varnish.

On plates of zinc the biting-in acts in the same way as on steel; but copper requires much stronger aqua fortis, and the varnish offers less resistance. But as iodine cannot be used on zinc or copper, from its forming insoluble iodides, the plate must be bittin-in with solution of iodine by means of a galvanic battery. In this case the image should be completely visible and not *veiled*; if it be at all so, aqua-fortis only must be used.

The color of metals remarkably affects the time in which the varnish is influenced by light. Varnish on silver is impressed three times more rapidly than on steel or copper; and on zinc more rapidly than on steel, but less so than on silver; this is doubtless owing to the whiteness and polish of the metal.

Plates taken from photographic prints may probably need retouching by an engraver before they are perfect: but even thus the advantage of being able to obtain so readily and exactly an outline, which in the ordinary process of engraving requires so much time and trouble to produce, is an immense advantage.

XIII. *Method of operating in the Camera.*

M. Nièpce claims to be the first person who engraved *on steel* by sunlight directly in the camera, having presented such a plate, untouched by the engraver, to the Academy of Sciences on October 8, 1855.

To obtain a distinct image on steel in the camera, a varnish highly sensitive and sufficiently resistent to the mordant is necessary; and the image need not be completely visible before development, as in operation by contact. All the bitumens of Judæa are invailable, but those are preferable which are naturally sensitive.

The bitumen of Judaæ, being dissolved in benzine and a tenth part of oil of citron, should be put into a bottle not quite filled, and the cork of which will allow the air to penetrate; it should then be exposed to sunlight for half an hour or even more, or for five or six hours in diffused light. The time of exposure to air and light varies on account of the natural sensitiveness of the bitumen of Judæa, and according to the time that the benzine and oil have been submitred to their action, which is so rapid that the benzine and citron should be used fresh made, or kept from any influence of light.

The time of exposure in the camera varies from half an hour to an hour in the sun, and from two to six hours in diffused light.

The image will come out *veiled*, But this is as it should be. Too long exposure prevents perfect development; and therefore the varnish should be prepared as wanted, because as soon as it has been influenced by air and light it becomes sensitive.

The varnish may also be sensitized thus:—Expose oil of citron, of bitter almonds, or of aspic, to the air and light until saturated with oxygen; then put the oil into a cup and shut it up into the camera with the plate spread with an unsensitized varnish. Very little heat, however, must be used, or the vapor will dim the lens and attack the varnish, and therefore this plan does not seem very practical.

M. Nièpce is not satisfied that he has discovered a varnish which is sufficiently sensitive, and yet has the property of reproducing an image sufficiently developed by the solvent, and he is still experimenting in this direction. The operation of graining must be performed by solution of iodine.

It is evident that the operations with the camera are longer and more difficult than those by contact; but the proofs have the advantage of never needing to be retouched, and of giving results fully equal to the finest engravings. The portrait of M. Nièpce, which is the frontispiece of the treatise, is a corroboration of this assertion.

XIV. *Engraving on Glass.*

For this purpose there must be added to the varnish about 15 arains of caoutchouc, previously mixed with oil of turpentine into a thick paste. It will not do for the metal plate, as it will not do for the metal plate, as it will not stand the heat required for the graining of the aqua-tint. The operation is performed as on the steel, taking care to put a sheet of white paper under the glass. The image should come out *unveiled* if working by contact, slightly so if in the camera. The plate is submitted to the fumes of hydroflouric acid if the engraving is intended to be flat, and to hydrated acid if deep. In working on glass colored only on one side, a white picture may be produced beneath the color.

The 'Revue Photographique' adds to its notice of the work, that M. Nièpce has produced by the same process beautiful mosaics on marble; biting in with sulphuric, hydrochloric, acetic, or carbonic acid, and filling up the hollow parts with coloring matter, or with mastic, or with oxychloride of zinc. This may be worth the attention of architects and decorators.

All who read M. Nièpce's very interesting treatise must agree, that if he has not placed before the world a perfect method of photographic engraving, he has at least discovered one which is already capable of producing very favorable results, and which opens a wide field for experiment in a direction where it is much needed, namely the combination of unering fidelity of representation (which can only be accomplished by light) with the certain permanency and quick production of prints, such as engraving ensures. With such scientific and persevering investigators as the author, M. Pretsch and others, all working by different means, and with increasing success, for the same end, it does not seem too bold to predict a vast change in the art of engraving before many years have elapsed.

From Notes & Queries.

ON STEREOSCOPES OF OBJECTS SMALLER THAN THE LENS.

I have lately read Sir David Brewster's work on the stereoscope, in which he has gone into the subject thoroughly, and I dare say ably, and has thereby rendered good service to all who may wish to know the exact truth in this very interesting subject. I must confess that, until his book came out, I could not tell how to set to work as regarded stereoscopic pictures, which are wonderful and charming.

I cannot help thinking, however, that Sir David Brewster has made one mistake; and, as it seems to me to offer a fair field for elucidation, perhaps you may not object to the subject being discussed in "N. & Q."

Sir David Brewster says, in p. 175 of his book, when objects *less* than the lens are taken, that, beyond a certain point, other objects behind and less than the front one, will be seen through the centre of it like ghosts. This, I must say, startled me, and I at once went to work. I placed a circular piece of black card paper, half an inch diameter, as my front object; another, of white card-paper, three-sixteenths of an inch diameter, behind,

at the nearest proper distance: and, on focussing the black, there was seen a white *ring round* the black image, and not within it, as Sir David Brewster says would be the case. There was the fact, and I could not understand it, and so sat down to *think* over the puzzle. I say puzzle, because one of the laws of optics says that divergent rays are formed further from the lens than those which converge: yet there was the white ring, which I thought should not be visible, or, if so, should occupy the whole of the focussing glass except the black card; and not only so, but that any object, however small, as it sends divergent rays from every point of itself to every point of the lens, there would consequently be a thorough conglomeration for the picture. And such, I believe, would be the result if divergent rays were brought to a focus. How could it be otherwise? But still there was the stubborn fact of the white ring around the front black image. Surely, said I, there must be some other cause for this than that asserted by Sir David Brewster, and I believe it to be this:—That the rays from the object behind are, in passing the front one, refracted, and that they, and not the divergent rays, produced the white ring; and this opinion was strengthened as I went on, for I measured the pictures on my focussing-glass, then removed the front black card-paper, and I found the image of the white paper measured very considerably less than before. I tried this at various distances, always with a like result.

This seems to me to solve the mystery; for, did the divergent rays produce the image, it would measure alike both before and after removal of the front object. I believe that pictures produced by a lens are the resultants of the convergent rays, and that those which diverge would, as I said, be a confused, conglomerated mass, and not a picture at all. I at once admit that I know very little of the science of optics, and that I have been guided by mere common sense in this matter, and am, very likely, in error. Still I consider it a fit subject for elucidation; for it is evident that Sir David Brewster's statement is, in some way or other, incorrect; and, unless you object, I have no doubt that some of your correspondents, much more conversant with optics than I, will soon clear up this point. J. Stephens.

From Notes & Queries.

DEATH OF MR. LEACHMAN.

It is with great regret that we announce to our photographic readers the death of Mr. John Leachman, whose contributions to the photographic department of our First Series, though not very numerous, occupied him many hours in chemical research and investigation, and were of great value and interest. Mr. Leachman's acquaintance with chemistry and its applications was profound and accurate: he had been a pupil of Graham's at University College, and was subsequently an ardent student at the College of Chemistry, under Mr. Hoffman; and his contributions to "N. & Q." brought him in communication with the first chemists in the country. He died at Margate on Friday, Sept. 19, after a short but severe illness (bronchitis followed by rheumatic neuralgia), brought on by lying on damp grass. He is interred at St. Peter's Church, Isle of Thanet.

From the Jour. of the Phot. Soc.

FRENCH MUNIFICENCE.

The "vexed question" of the permanence of prints photographically produced being still involved in doubt, artists have naturally hesitated to commit their productions to a process which cannot authoritatively guarantee durability. In this dilemma many men of high scientific attainments have turned their attention to the combination of the ordinary printing materials, whose permanence is unquestionable, with photographic processes, which must ensure fidelity of representation. Of the result of these experiments some remarkable accounts have been this year given to the world; among the most prominent of which are those of Herr Pretsch, detailed to our Society at a recent Meeting, and those of M. Nièpce de St. Victor, noticed in the present Number of the Journal. But though much may be, and is, done by private energy and enterprise, the helping hand of a liberal and enthusiastic patron must be of immense service. Such a patron our Art has found in the Duc de Luynes, a French nobleman of high repute in the scientific world. He has placed at the disposal of the French Photographic Society the sum of 10,000 francs, to be divided into two prizes.

The first prize of 8000 francs is to be given to the author, who, in the space of three years, shall have solved the problem of the reproduction of photographic prints, either by engraving or by lithography, in a manner satisfactory to a Committee to be chosen by the French Society.

In case the Committee do not consider any candidate to have satisfactorily fulfilled the conditions requisite for obtaining the prize, they are empowered to award to him who approaches nearest to the solution, either by new discoveries or by perfecting means already known, such sum as they shall judge merited.

The second prize of 2000 francs is intended as a reward for the author who, in the space of two years, shall have made the most important advance in the production and preservation of positive prints, either by the discovery of new processes, or by a complete study of the different chemical actions in the present processes which affect the fading of prints.

The time of sending in papers for the first prize expires on July 1st, 1859; for the second prize, on July 1st, 1858; and no applications will be received after those dates.

The whole scheme seems most liberally and fairly devised; for the competitors are not required to keep their processes a secret, nor will any patents they may choose to take out be interfered with, and their papers will be kept sealed until the sittings of the Committee appointed to decide on their merits. The papers of candidates, however, will not be returned, but will be deposited in the archives of the Society. The prizes are open *to the whole world*, and there can be no doubt but that strict impartiality will be shown.

To the Editor of the Photographic and Fine Art Journal:

New York, October 28, 1856.

Sir,—I notice that in the October No. of your Journal, you state the suits for the protection of the Ambrotype process now pending, have been at my request postponed for the term of six months.

I trust you will do me the justice to say in your next issue, that the information which you have received is an entire falsehood, without a shadow of truth for its foundation. Instead of delaying the issue, I have done all in my power to urge them on to a termination.

Very respectfully, yours,

Wm. A. Tomlinson.

For the Photographic and Fine Art Journal.

ASPHALTOTYPE.

Charleston, October 16, 1856.

Mr. H. H. Snelling,—*Dear Sir:*—I am much obliged to you for your kind letter of the 6th of October, and I shall do as you advise me. I was to write to you about something, which perhaps will be agreeable to many a photographer, and when you are of the same opinion, you may publish the following in your Journal.

I have been taking positive photographs for my own amusement more than 9 months on japanned tin, without being acquainted with the fact of its having been done by others. The chief difficulty was to envelope the iron edges and the tin back of the sheets, so as to prevent the iron and tin from coming in contact with the nitrate of silver in the bath. Tin japanned on both sides would have answered admirably, but I was in a place where I could not get it. The positives taken in this way, were very bright and deeper in tone than any ambrotype blacked on the back. Speaking about these pictures a few days

ago with Mr. A. McCormick, a photographer of this place, he asked me how it would do to use, instead of japanned tin, old useless daguerreotype plates. We took one and coated first the back with Mr. Anthony's black varnish for ambrotypes, and then, when dry, the front side and edges, carefully drying the plate in a horizontal position away from dust. When the plate was dry, we took an ambrotype in the common way, but dried it when finished with the daguerrean gilding lamp, and in the same way as a daguerreotype. This last drying by heat makes the picture adhere more firmly to the black varnish. Another plate, after the picture was taken and well washed, we whitened with bichloride of mercury, which brought it out beautifully (I had been doing this with the positives on tin), and dried it with the lamp. These pictures adhere when whitened very firmly to the varnish, and can be painted more easily than ambrotypes. The advantages of the use of old daguerreotype plates is, first, a saving of glass plates ; second, the facility to cut them to any size, for lockets, rings, &c., and the increased brilliancy of tone, and some saving of time; I found it to work a 3d quicker than on glass. Water will not take them off when dried with the lamp, and when washed off with alcohol, the picture is very sharply impressed on the varnish. The objection to whitening the pictures with mercury is (when not varnished), that they soil the coat on the glass when put up as the daguerreotype, with whitish lines and streaks, which can be avoided by varnishing the picture, but by which most of the brightness of the lights are lost, and more so when the picture has not been brought out with mercury. Another disadvantage is that the picture is reversed, but it is thus the same with the Melainotype and many other styles of taking positives. Now if you think this worth your while to publish it, I wish you would do it in your own style, for mine is so deficient as to render publication almost impossible.

Another great advantage of using the above-mentioned plates, is the facility of cleaning them. When carefully prepared and dry, they may be put up between soft paper and kept in a drawer out of the fumes of the operating-room, and the picture can be taken without cleaning the plate at all; and when markings of the fingers or other specks are seen on the plate, they can easily be taken off by breathing on it and rubbing with cotton wool gently.

I hope to hear from you again.

I am respectfully yours,
A. Wenderoth,
King Street, American Hotel.

For the Photographic and Fine Art Journal.

OHIO STATE FAIR.

Friend Snelling,—Presuming that any account which chronicles the doings of Photographers and Daguerreotypists, would prove of some interest to the readers of your valuable Journal, I venture to send you the following account of the exhibition in the Fine Art department of the State Fair of Ohio, held in Cleveland on the 23d, 24th, 25th, and 26th ult.

The Photographic, Daguerreotype, and Ambrotype departments were represented by Ryder, North, Boisseau, Stimpson, and Mrs. Short of Cleveland, Mr. Bisbee of Columbus, Mr. Collins of Urbana, and Whitehurst of Washington, D. C.

Mr. Ryder exhibited a large number of Photographs, life and small size, plain and colored, which were very creditable to him and his artists. His life-size plain photographs were executed with all the strength and detail of the smaller size, giving us therein a chance to judge of photography without paint. Mr. Fontayne, late of the well-known firm of Fontayne & Porter of Cincinnati, has charge of his photographic department.

Mr. North exhibited photographs, life and small size, plain and colored in oil; also daguerreotypes and ambrotypes. No plain life-size by this artist: some six or eight life-size colored in oil. The style of coloring in these, were principally characterized by excessive smoothness in finish, but the pervading colors being white and blue in the faces, gave a cadaverous hue, which is not agreeable to contemplate. His daguerreotypes and ambrotypes harsh in tone, otherwise good.

Mr. Boisseau exhibited a few painted portraits on canvas colored by himself; they were rough and course, betraying a new hand. These being nothing but tracings from a glass negative on canvas by means of light; it is somewhat questionable about their being photographs as they were labelled.

Mr. Stimpson's show of ambrotypes was small but good.

Mrs. Short made a very fair display of ambrotypes, some of which were very creditable.

Mr. Bisbee of Columbus, exhibited some very fine daguerreotypes and ambrotypes. In the latter, he gains what the fraternity all strive for but seldom reach,—that is, pure whites and blacks with great brilliancy. I would direct his attention, however, to an improvement in the arrangement of his light. He should not be afraid of shadows, should also study position.

Mr. Collins' ambrotypes were not very good, they lacked tone.

Whitehurst showed three plain photographs, two of which were groups. There was nothing in them worthy of notice, save that they were Whitehurst's; should judge from them, that he was "laying abed all day."

Ryder carried off the first premium for all his photographs, large and small, plain and colored.

Bisbee of Columbus, took the first premiums for daguerreotypes and ambrotypes.

Yours truly, C.

BALSAM PATENT.

——" The small infantry
Warred on by Cranes."—Paradise Lost.

" In mercy spare us when we do our best,
To make as much waste paper as the rest."

H. H. Snelling, Esq.,—*Dear Sir:*—I am not superstitious and consequently not very easily frightened at apparitions; and yet, I must acknowledge that I was somewhat startled to see the ghost of the balsam patent in the last number of the Journal. I had supposed that the old fellow had been dead and buried too long, to be galvanized or gammonized into being again. His friends may puff him up for a little while, and make a sort of a scarecrow of him to frighten off green ones; but to do more than this, or even this, for any length of time, will be like all their other undertakings, a dead failure. It can very readily be seen, that although frightened at first sight, he has no life in him and is perfectly harmless. I could have told his friends the absurdity of *cutting* up such didoes, as to attempt to restore him to his original youthful activity: the old fellow is entirely too ancient to attempt any such nonsense with. He must be at least three times three score years and ten. His visit doubtless was a bad move for him: his health considerably impaired before he left home, began rapidly to decline soon after his arrival at Richmond, Va. He has made a desperate struggle to *recover.* He applied to Doctor Halyhorton; the doctor felt his pulse and his head, in the latter he discovered a large soft spot, which was ordered to be filled up immediately with balsam, bromide of potassium was made into a plaster and laid snugly over the breach; alcohol and gun-cotton was applied *very* gently to his temples, camphor held to his distended nostrils, but alas! without any good effect. He grew worse and looked green out of his eyes. I read a prayer or two from a little book, this had the effect of bringing him too a little; he began again to describe very pitifully his symptoms, by which he disclosed a dry and sickly tongue. The doctor very candidly told him that he could do nothing for him, that his case was a hopeless one, and as he was *too weak* for an injunction, he therefore would recommend him to *travel.* The next time I heard from him, he was staggering about Washington; was taken much worse, had ultimately *given up his claim to a world of trouble,* and was recently interred. And now his friends act as though he had just merely *taken a glass too much,* and it had thrown the old fellow into a sort of a stupor or

trance. How sadly mistaken. I know it is sometimes said that we bury the dead too soon, but can this be said of old Balsam? I think not. My private opinion is, that we kept the old fellow entirely too long above ground. He had become quite *disagreeable*, we should have disposed of *him* as we did with his blustering companions, Alcohol, Bromine and Camphor, promptly and at once. With the hope that these resurrectionists who have been guilty of exhuming old Balsam, may be made to suffer for their folly.

I subscribe myself yours sincerely,

M. P. Simons.

BLACK VARNISH.

To the Editor of the Photographic & Fine Art Journal:

Mansfield, Richland Co., O., Oct. 20, 1856.

Sir,—I have just finished the perusal of the October No. of your valuable Journal. I find in its columns a communication in regard to the cracking of Black Varnish, and also your request for information on the subject.

The experience of sixteen years in working all kinds of varnishes and paints, satisfies me that the cracking of varnishes and paints is in most cases the fault of application, not of the material used or the surface that receives it. I have used this varnish on wood and iron for eight years, and never had it trouble me with cracking, and in the last few months I have put up hundreds of ambrotypes always using the Black Varnish, and I have never had a picture crack in one single instance to my knowledge, unless it was some few pictures that I put up cold for experiment. I have put up pictures with several different kinds of spirit varnish before applying the Black Varnish, and a number with the Black Varnish directly on the collodion film, and so far they have stood the test without any perceptible change, therefore I attribute the cracking of varnish entirely to a bad application, and I think if all operators would follow my plan strictly, they would have no trouble with their pictures cracking.

I take my glass out of the fixing bath and wash it thoroughly in pure rain water, and then dry it immediately over the blaze of my spirit lamp, and while hot I flow on my spirit varnish, and keep my glass moving over the lamp until dry. While it is still hot I flow on my Black Varnish, and keep the glass hot until the varnish is perfectly dry. After it is perfectly hard and dry, it cannot crack. The varnish should be sufficiently diluted so that it will flow over the plate readily. Now this may not be new with most of operators, but I would caution them against varying from this plan, if they do they must expect trouble. I have had the pleasure of visiting quite a number of galleries this summer, and almost every artist is down on the Black Varnish because their pictures crack, but they would like to use it if they dare, for they can find nothing to fully take the place; they have substituted black velvet, black paper, and some an extra glass, which leaves a metallic reflection in all the darks of the picture, which I consider to be in direct enmity with one of the most striking points of merit in the "Ambrotype;" (if we claim in the Ambrotype process that there is no metallic reflection), if we can do away with it, let us do it and improve in beautifying the picture instead of going back. If you think these few hints of value to your subscribers, you are welcome to make them public through your columns. There is only one cause that I can assign for the cracking of the varnish; that is, that in applying the varnish to the glass when cold, the varnish commences drying on the outer surface first, and forms a film on the outside, so that when it dries underneath (and as it is dried by evaporation), it must shrink under the film on the surface, and as the film on the surface is hard and brittle it cannot shrink, therefore it must crack and give way; if the glass is hot, it will commence drying next to the glass, and then you are safer.

I remain respectfully yours,

A. P. Willoughby.

Personal & Art Intelligence.

— We are often led to ask ourselves the question—"are men in all branches of business so universally obtuse to their own interests, to the actual requirements of their business as the photographers of America? if so, how in the name of common sense do so many manage to get through life?" We see men in the Photographic Art, almost daily relinquishing it, because patronage deserts them, who might, by a little more study and a little more practice, become fine manipulators. Although, as a mass, our people possess very little of pure taste, still the majority can tell when they get a picture to please them, and as a matter of course they will go to those establishments which produce the most satisfactory results at the most reasonable prices. Now, in order to please, it is not always necessary to cater to vitiated taste. A daguerrean or photographer who thoroughly understands his art, can readily produce such modifications in his pictures, as to obtain light or dark impressions without sacrificing strength, tone, or color. In order to do this, however, he must understand every phase of his art, and as no man is capable of working out himself every improvement required in his manipulation, he is more or less dependent upon others. Such improvements and discoveries are to be obtained in but two ways,—these are, either by practical instruction from the discoverer, or through the medium of books and periodicals. Now as it is a matter of impossibility, in every instance, to consult the discoverer personally, we are in the main dependent on the publications. Besides, practical instruction is to be obtained only at an exhorbitant outlay of money, while the publications give the same information at a mere nominal price. There are very few men who may not master any one of the arts and sciences by proper application to the study of the books treating on the particular subject required. If this were not the case, the men of learning who now surround us, could never have attained the eminence upon which they sit; for had they depended upon tutorage alone, few could have sustained the expense, and, as in ancient times, a learned man would be as great a curiosity as any of the montrosities that are exhibited from town to town. We care not what may be the occupation of any man, in order, not only to attain, but to preserve eminence in any pursuit, his mind must constantly be given to its study. The lawyer, the doctor, the artizan, the painter, the preacher, and even the merchant and mechanic, as well as the teacher and philosopher, understand this principle and act upon it; but it seems to us that the photographer, generally speaking, belongs to an isolated class of beings, who considers that his success requires simply understanding a certain routine of manipulation, and that all future operations being based upon that routine are of very little consequence. Incapable of seeing beyond the present, they doubt the possibility of improvement and rest upon the doubt, working blindly and perversely their own destruction. The events connected with the Photographic Art which have transpired during the last three years, fully confirm the accuracy of these remarks.

When, in our capacity of editor, we made certain prophecies several years ago, we were met by the same doubts, the same short-sightedness that now seems to prevail, although, we must confess, to much greater extent. At that time the daguerreotype process alone was practised in this country. We urged the necessity of all photographic artists adopting the paper process; or turning their attention more to the discoveries of the European savans. None would believe that any of these discoveries would ever prove available to them. But they have lived to know better. Had more attention been paid to the various formulas published in the *Photographic and Fine Art Journal* years ago, men would not have got rich in imposing upon the great body of American daguerreans, discoveries not their own. There are hundreds of cases where men have paid fifty and one hundred dollars to itinerant instructors for photographic formulas, that they might have obtained in our *Journal*, together with other instruction sufficient to have secured successful results, for five dollars. One photographer made his boast to us that he had sold *one* receipt taken from the *Journal*, for enough to

pay for five years subscription. There has not been an ambrotype process taught during the last three years, by the travelling teachers, that had not previously been published. There is not a process practised which may not be improved more or less, by reference to the published experiments of European and other photographers. Some of the best photographers in this country, are men who never paid a dollar for any other instruction than that derived from the *Photographic and Fine Art Journal;* and those who now rank the highest, worked out their own formulas from what they read, and not from what they received second hand.

We have been led into these remarks by an occurrence of recent date. New York has (that is New York Photographers) run mad after a so-called new process, which reduces the time in the camera to two and three seconds for glass negatives. Now, if our subscribers had tried Monckhoven's processes, as published in the Journal, we venture to say that they would have found a formula that would produce the very same results in every particular. But no, this could not be. Printed formulas are all "bosh," written instruction good for nothing. It requires, in order to introduce any thing to the American photographer, that some speculative genius should patent the process, or announce it as a new German, or a new French process known only to himself, charge fifty or one hundred dollars for the secret, and all rush after it like pigs to a trough of hot swill—no matter how severely the first who dips his nose in gets burned, the rest must dip theirs in also to the same tune. Thus, by the illiberality of the knowing ones and the folly of the green ones, the majority of American photographers are fleeced out of thousands of dollars annually. It is our duty to endeavor to correct this evil. If we cannot do so by appealing to the generosity and honesty of those who are able to assist us in our endeavors, we shall spoil their sport whenever it lies in our power. With the assistance of one who has always shown himself one of the most liberal as well as devoted to the Photographic Art, we shall be able to lay this "*new process*" before the photographic community in a very short time. This process is a very fine one, and all that is claimed for it, and will be given so that all who are in the least acquainted with photography can work it without further instruction. We shall first publish it in pamphlet form, in order to put it into the hands of all at the earliest possible moment. We take this course because we do not consider that any one has a right to speculate upon processes already published in Europe, by charging excessive prices. It is our duty to guard the Art from such charletanism, and in performing it, we shall always take the best means in our power. The *Journal* would be of little worth to our subscribers, if we permitted the system which has so long been pursued by many, to go unrebuked.

— Our visit to the Fair of the American Institute in this city was, in a measure, a disappointment to us. The collection of Daguerreotypes and Photographs was not so large as we expected to see, and a very small number of our Photographic artists were represented. Of those who exhibited, by far the larger portion seemed to base their claims to notice on their colored specimens. We should have preferred a larger collection of Daguerreotypes, Ambrotypes, Melainotypes, and plain Photographs. The display and arrangement of the pictures was not at all to our taste. There certainly must be something wrong in the management of the Institute, that so many of our artists should neglect to furnish its exhibitions with their work. With the exception of two or three, there are few pictures exhibited at this Fair that have not their superiors in the galleries of their owners.

In visiting the gallery, the first pictures we met with were six large unretouched landscapes, by Mr. V. Prevost, of 24th street. These pictures are from paper negatives, and are almost equal to the imported French Photographs. They require greater clearness and depth of tone to equal the best specimens of the French masters. The next in order were a few specimens on silk by Meade Brothers. These are not so good as some we have seen by the same artists.

G. N. Barnard, of Syracuse, comes next in order, and exhibits some very excellent plain unretouched Photographs. There is great uniformity of tone and strength in these pictures, and they do him much credit.

N. G. Burgess, of New York, has a small collection of some of the most beautiful and finely-finished Ambrotypes we have ever seen, possessing more closely than any others the richness and softness of the Daguerreotype. He has attained a degree of perfectness in this style of Photograph that none can hope to excel. He is followed by

A. Judson, of Newark, N. J., who presents specimens in almost every respect equal to Mr. Burgess's—the latter gentleman's excelling his only in warmth of tone. These two collections are decidedly the best Ambrotype portraits in the exhibition. After passing various minor works of art and needlework, hung indiscriminately upon the walls, in very bad taste, we come to the collection of

A. Hesler, of Chicago. The few Daguerreotypes exhibited by this gentleman are executed in his usual style of excellence, but as they are the same as exhibited at the "World's Fair," we have already spoken of their merits. His plain and retouched Photographs are very fine, fully displaying the refined taste and masterly workmanship which has given him so much celebrity as a Daguerreotypist. His water colored Photographs do him equal credit, while those colored in oil are not outdone. The picture of the "*Rag Pickers,*" and its four companions, are little gems, and indicate his aptness for composition. These, with the Ambrotypes of Mr. Lewis, are the only attempts at composition by the camera in the exhibition.

S. Root next claims our attention. His collection is small, consisting of a few exquisitely retouched heads. The artist employed by Mr. Root certainly understands the art of retouching in India ink better than any other in this country, so far as we have been enabled to judge.

Hawkins & Faris, of Cincinnati, have a frame filled with their new style of Ambrotype, colored in oil. We should have preferred specimens of plain pictures on paper or glass, or even of their fine oil colored life size. If these exhibited specimens of *oil* colored *Ambrotypes* are the best that can be made, we certainly shall not advise them to continue their manufacture. They can most unquestionably do better in other branches of their art, for as a Daguerreotypist and Ambrotypist, Mr. Faris is unsurpassed by any except Messrs. Burgess & Judson.

Meade Brothers have a good display of plain and colored photographs. Their portraits of the candidates for the Presidency, are the best in the collection. Their plain photographs are very fine, and possess that warmth and richness of tone peculiar to the Paris pictures.

J. Gurney has a large collection in every style of the Art. It is to be regretted that in none of the collections, are the pictures designated by name, as it obliges us to speak of them in a general way, and prevents us from particularizing. His plain photographs are decidedly the best in the Exhibition; the nearest approach to them being those of Mr. Hesler, in photographic manipulation, although we must accord the palm to the latter gentleman in gracefulness and artistic skill. Their superiority, in our eye, consists in the clearness of light and shade, and in the sharpness of outline and roundness of figure. The blacks of these pictures are very transparent, which is a great desideratum in a fine photograph. Of the portraits in oil, that of Mr. Gurney himself is very excellent. It is one of the most life-like we ever saw; so much so that you almost imagine it is about to address you. Mr. Gurney as well as

Mr. C. D. Fredericks, who comes next in order, have the advantage of the best light afforded by the *Crystal Palace* for the exhibition of pictures, which even here is none of the best. Mr. Fredericks's collection is also very large, consisting principally of life and cabinet size portraits in oil and pastel, and his claims to excellence are so equally ballanced with those of Mr. Gurney, that the same remarks applied to the one are equally pertinent to the other. In this collection we have to comment highly on the head of Mr. Penabert. It is well finished and artistically colored. The cabinet full length picture of Mr. Fredericks, de-

serves special notice. The excellence of the pastel portraits are not approached by any on exhibition, while the retouched photographs vie with all, except those of Mr. Root. That Mr. Fredericks stands at the head of his art is fully evinced by this brilliant display at the exhibition.

J. E. M'Clees, of Philadelphia, evinces good taste and a proper appreciation for his art, by exhibiting only plain unretouched pictures. They are all views and well executed.

S. A. Holmes, of New York, exhibits the largest and best Ambrotype views in the Fair. They are probably the largest *Ambrotypes* ever taken, and are exceedingly fine. They consist of a series of views, taken from different points, of the Falls of Niagara, and they certainly give more correct ideas of this stupendous creation of the Almighty, than ought else, save the Falls themselves. They are a masterly success upon the part of Mr. Holmes.

R. A. Lewis exhibits a fine collection of *Ambrotypes*, several of them of the most exquisite finish. They possess great depth of tone, fine transparent shadows, and give good stereoscopic effect. His fancy pictures are very effective.

W. A. Tomlinson exhibits *Ambrotypes* only; all of large size, and for large pictures are quite good. We were, however, disappointed in them. They are generally too cold in tone and harsh in outline to please our taste. One or two of them we noticed as exceptions to this rule; but as a whole, they are inferior to those already mentioned.

Mr. Kertson exhibits a small frame of small Daguerreotypes.

Messrs. Hofraugh & Co., exhibit a few *Photographs* that are quite fair.

Prof. Loud is loudly represented by a frame of *Ambrotypes.*

Mr. Neff, of Cincinnati, O., has a fine collection of *Melainotypes.* This style of picture we have spoken of in a former number, and we can only add here, that our prediction as to their capability of superseding the *Ambrotype,* is fast becoming realized. There is a pleasing *artistic* effect about them, that can never be produced by the ambrotype. This, together with the perfect ease with which they can be made, the certainty of their everlasting quality, and the impossibility of their destruction by any of those accidents which would be the ruin of an ambrotype, will secure their general adoption.

In another part of the Palace, we came across a model of a new Daguerreotype plate cleaning and polishing machine, the invention of Mr. Charles Ketchum, of Penn Yan, N. Y., which struck us as a very effective thing. If introduced, we have no doubt it will be adopted by very many of our daguerrean artist. Mr. Holmes, we understand, has one in operation and is highly pleased with it.

— Mr. J. F. Rider, of Cleveland, O., received the *highest premium* for *plain* and *colored Photographs* of life and smaller sizes, at the Ohio State Fair held in Cleveland during the last week in September.

— Mr. Bisbee of Columbus received the *highest prize* at the same Fair, for *Daguerreotypes* and *Ambrotypes.*

— L. W. Keen.—The same difficulty is constantly occurring to every ambrotypist. There are several methods suggested in our October number for its avoidance, and Mr. Willoughby gives his method in the present number; but the only sure way is to use purple glass; or better still, to adopt the Melainotype process and plate.

— The Photographs exhibited at the *Mechanics' Fair* at Louisville, Ky., are thus spoken of by the *Journal* of that city:

"Mechanics' Institute.—The rain last night prevented a full attendance, and it was closed at an early hour. We have no doubt that, if the weather is propitious to-night, the hall will be crowded. We would advise strangers in the city by all means to visit the hall. They can nowhere else see so many matchless beauties as at the hall. We continue our notices of the different exhibitors:

"In the picture gallery, Webster & Bro. make a beautiful display of portraits in almost every style of the Heliographic art. Among them we notice a large sized Photographic portrait in oil, of the late Presley Ewing. This portrait is from a daguerreotype taken by and now in the possession of the Messrs. W. It is said to be the best likeness of Mr. Ewing in existence.

"Next is a Photographic portrait, in pastel, of a beautiful young lady, and also one of a little boy (Mr. Cornet Taylor's son) in the same style. These are really beautiful pictures. They are about half life size, taking in half or two-thirds of the figure. Nothing can excel them in truthfulness to nature, minuteness of detail, or gracefulness of attitude. They are really wonderful productions of the combined efforts of the painter and photographist.

"We also noticed several smaller photographs, colored in oil and water, which are very beautiful, and a large number of plain photographs, fully equal to any produced by any other artist. These pictures have the merit of not being retouched, a process which improves the appearance of the picture, but it is not a proper test of the photographer's skill.

"Webster's daguerreotypes need no comment. Their reputation in this department is second to none in the Southwest, and we might add in the East also. Those now on exhibition are the same which they exhibited at the World's Fair in New York. The group of young ladies were considered the best frame of pictures in the Crystal Palace; the others are equally good.

"But the most beautiful of all 'types' are the Sphereotypes. We have never seen anything equal to them produced by the camera, unaided by the painter's hand. They seem to stand out in bold relief, while there is a softness of shadow, beauty of detail, and warmth of tone never found in other styles of pictures taken on glass. These pictures have the appearance of being taken on a spherical or convex surface. The large impressions (which, by the way, are twice as large as any pictures ever taken in this city) having the appearance of pastel pictures, but are more perfectly delineated. They represent the loveliness and beauty of Louisville's charming daughters.

"Several other Daguerreotypists, Ambrotypists, and Photographers exhibit beautiful specimens, but we must defer a notice of them for some future occasion."

— At the *Kentucky State Fair,* held at *Paris* on the 1st of October, Mr. J. C. Elrod received the *highest prize* for Ambrotypes, Daguerreotypes and Photographs. It is seldom that the same exhibitor carries off the palm in every branch of this Art, and this fact speaks well for Mr. Elrod as an artist.

— Messrs. Fasset & Cook's exhibition of photographs at the *Mechanics' Fair,* of Chicago, Ill., is thus spoken of by the *Daily Democrat*—

"Fasset & Cook take the lead at the exhibition on photographs and ambrotypes. Their plain specimens show a most thorough knowledge in the science of obtaining pictures by the fingers of light, and those finished in colors show the touches of fingers of artists of rare accomplishment. They are genuine students and judges of art themselves, and employ the aid of the best artistic talent in the country. In arrangement, clearness, delicacy and effect, their pictures cannot be excelled."

— We have at last effected an arrangement by which we shall be enabled to supply our subscribers with all the promised illustrations for this year, and we trust such as will enable us to furnish them regularly through our coming volume. Those who do not receive the photographs due them with the December number, will do so during the month free of postage. We should like to have a few more good negatives.

— Patents have been lately issued to Peter Hanney for *improved blanks for bank notes,* &c., the claim being "the combination of the arts of photography and printing or writing, or both."—To D. B. & W. H. Spooner, for *an improved method of Photographic Pictures on Glass.* Claim: "the application of gum arabic or equivalent material." (We should like to see the patentees enforce this claim).

THE STEREOSCOPE
Its History, Theory, and Construction.*

BY SIR DAVID BREWSTER.

CHAPTER X.

APPLICATION OF THE STEREOSCOPE TO PAINTING.

As we have explained the only true method of taking binocular portraits which will appear in correct relief when placed in the stereoscope, we shall proceed in this chapter to point out the application of the stereoscope to the art of painting in all its branches. In doing this we must not forget how much the stereoscope owes to photography, and how much the art of design might reasonably expect from the solar pencil, when rightly guided, even if the stereoscope had never been invented.

When the processes of the Daguerreotype and Talbotype, the sister arts of Photography, were first given to the world,it was the expectation of some, and the dread of others, that the excellence and correctness of their delineations would cast into the shade the less truthful representations of the portrait and the landscape painter. An invention which supersedes animal power, or even the professional labor of man, might have been justly hailed as a social blessing, but an art which should supersede the efforts of genius, and interfere with the exercise of those creative powers which represent to us what is beautiful and sublime in nature, would, if such a thing were possible, be a social evil.

The arts of painting, sculpture, and architecture have in every eye, and in every region of civilization, called into exercise the loftiest genius and the deepest reason of man. Consecrated by piety, and hallowed by affection, the choicest productions of the pencil and the chisel have been preserved by the liberality of individuals and the munificence of princes, while the palaces of sovereigns, the edifices of social life, the temples of religion, the watch-towers of war, the obelisks of fame, and the mausolea of domestic grief, stand under the azure cupola of heaven, to attest by their living beauty, or their ruined grandeur, the genius and liberty which gave them birth. To the cultivation and patronage of such noble arts, the vanity, the hopes, and the holiest affections of man stand irrevocably pledged, and we should deplore any invention or discovery, or any tide in the nation's taste, which should paralyse the artist's pencil, or break the sculptor's chisel, or divert into new channels the genius which wields them. But instead of superseding the arts of design, photography will but supply them with new materials, —with collections of costume,—with studies of drapery and of forms, and with scenes in life, and facts in nature, which, if they possess at all, they possess imperfectly, and without which it must be stationary, if she does not languish and decline.

Sentiments analogous to these have been more professionally expressed by M. Delaroche, a distinguished French artist,—by Sir Charles Eastlake, whose taste and knowledge of art is unrivalled,—and by Mr. Ruskin, who has already given laws to art, and whose genius is destined to elevate and to reform it. M. Delaroche considers photography "as carrying to such perfection certain of the essential principles of art, that they must become subjects of study and observation, even to the most accomplished artist." . . . . "The finish of inconceivable minuteness," he says, "disturbs in no respect the repose of the masses, nor impairs in any way the general effect. . . . The correctness of the lines, the precision of the forms in the designs of M. Daguerre, are as perfect as it is possible they can be, and yet, at the same time, we discover in them a broad and energetic manner, and a whole equally rich in hue and in effect. The painter will obtain by this process a quick method of making collections of studies, which he could not otherwise procure without much time, and in a style very far inferior, whatever might be his talents in other respects." In the same spirit, Mr. Ruskin† considers "the art of photography as enabling us to obtain as many memoranda of the facts of nature as we need;" and long before Mr. Talbot taught us to fix upon paper the pictures of the camera obscura, the Rev. John Thomson, one of the most distinguished of our Scottish landscape painters, studied, in one of these instruments, the forms and colors of the scenes which he was to represent. Other artists, both in portrait and in landscape, now avail themselves of photography, both as an auxiliary and a guide in their profession; but there are certain difficulties and imperfections in the art itself, and so many precautions required in its right application, whether we use its pictures single, as representations on a plane, or take them binocularly, to be raised into relief by the stereoscope, that we must draw from the principles of optics the only rules which can be of real services to the arts of design.

In painting a landscape, a building, a figure, or a group of figures, the object of the artist is to represent it on his canvas *just as he sees it*, having previously selected the best point of view, and marked for omission or improvement what is not beautiful, or what would interfere with the effect of his picture as a work of high art. His first step, therefore, is to fix upon the size of his canvas, or the distance at which the picture is to be seen, which determines its size. His own eye is a camera obscura, and the relation between the picture or image on its retina is such, that if we could view it from the centre of curvature of the retina, (the centre of visible direction,) a distance of half an inch, it would have precisely the same apparent magnitude as the object of which it is the image. Let us now suppose that the artist wishes to avail himself of the picture in the camera obscura as received either on paper or on ground glass, or of a photograph of the scene he is to paint. He must make use of a camera whose focal length is equal to the distance at which his picture is to be seen, and when the picture thus taken is viewed at this distance (suppose *two* feet) it will, as a whole, and in all its parts, have the same apparent magnitude as the original object. This will be understood from Fig. 47, in which

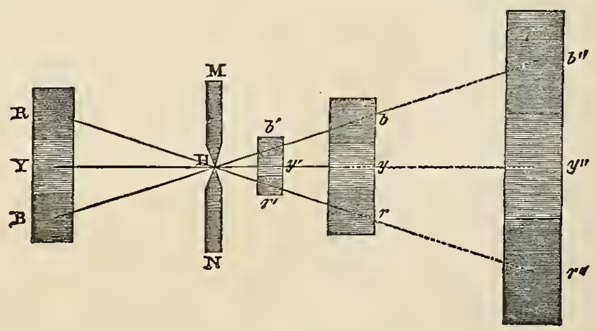

Fig. 47.

we may suppose H to be the lens of the camera, RB the object, and Hy' the distance at which it is to be viewed. The size of the picture taken with a lens at H, whose focal length is Hy', will be $b'r'$, and an eye placed at H will see the picture $b'r'$ under an angle b'Hr', equal to the angle RHB, under which the real object RB was seen by the artist from H. In like manner, a larger picture, byr, taken by a camera the focal distance of whose lens at H is Hy, will be an accurate representation of the object RB, when viewed from H, and of the same apparent magnitude. If either of these pictures, $b'r'$ or br, are viewed from greater or less distances than Hy', or Hy, they will not be correct representations of the object RB, either in apparent magnitude or form. That they will be of a different apparent magnitude, greater when viewed at less distance that Hy', Hy, and less when viewed at greater distances, is too obvious to require

* Continued from page 333, vol. ix. No. xi.

† *Modern Painters*, vol. iii., Preface, pp. 11, 12.

any illustration. That they will differ in form, or in the relative apparent size of their parts, has, so far as I know, not been conjectured. In order to shew this, let us suppose a man *six* feet high to occupy the foreground, and another of the same size to be placed in the middle distance, the distance of the two from the artist being ten and twenty feet. The apparent magnitudes of these two men on the photograph will be as two to one; and if we look at it at any distance greater or less than the focal length Hy' of the lens, the same proportion of two to one will be preserved, whereas if we look at the original figures at a greater or less distance from them than the place of the artist, the ratio of their apparent magnitudes will be altered. If the artist, for example, advances five feet, the nearest man will be five feet distant and the other fifteen feet, so that their apparent magnitude will now be as three to one.

The same observations apply to a portrait of the human face. In looking at a human profile let us suppose the breadth of the nose to be one inch, that of the ear one inch, and that we view this profile at the distance of *three* feet from the ear, which is two inches nearer the observer than the nose. The apparent magnitude of the ear and nose will be as thirty-eight to thirty-six inches, whereas if we view the profile from the distance of *one* foot the ratio will be as fourteen to twelve, that is, the ear will be increased in apparent size more than the nose. Hence it follows that all pictures should be viewed under the same angle of apparent magnitude under which they were seen by the artist as taken photographically, for if we view them at a greater or less angle than this we do not see the same picture as when we looked at the original landscape or portrait, under the same angle of apparent magnitude.

From the observations made in the preceding Chapter on photographic and stereoscopic portraiture, the reader must have already drawn the inference that the same landscape or building, seen at different distances, varies essentially in its character,—beauties disclosing themselves and defects disappearing as we approach or recede from them. The picture in the camera, therefore, as used by Mr. Thomson, or, what is still better, with the exception of color, the photograph obtained by the same instrument, will supply the artist with all the general materials for his picture. The photograph will differ considerably from any sketch which the artist may have himself made, owing to certain optical illusions to which his eye is subject. The hills and other vertical lines in the distance will be lower in the photograph than in his sketch.* The vertical lines of buildings will converge upwards in the photograph, as they ought to do, in receding from the eye; and in the same picture there will be a confusion, as we shall afterwards shew, in the delineation of near and minute objects in the foreground, increasing with the size of the lens which he has employed.

In his admirable chapter "On Finish," Mr. Ruskin has established, beyond a doubt, the most important principle in the art of painting. "The finishing of nature," he states, "consists not in the smoothing of surface, but the filling of space, and the multiplication of life and thought;" and hence he draws the conclusion, that "finishing means, in art, simply telling more truth." Titian, Tintoret, Bellini, and Veronese have, as he has shewn, wrought upon this principle, delineating vein by vein in the leaf of the vine, petal by petal in the borage-blossoms, the very snail-shells on the ground, the stripe of black bark in the birch-tree, and the clusters of the ivy-leaved toad-flax in the rents of their walls; and we have seen that a modern artist, Delaroche, considers a *finish* of *inconceivable minuteness* as neither disturbing the repose of the masses, nor interfering with the general effect in a picture.

The Pre-Raphaelites, therefore, may appeal to high authority for the cardinal doctrine of their creed; and whatever be their errors in judgment or in taste, they have inaugurated a revolution which will release art from its fetters, and give it a freer and a nobler aim. Nature is too grand in her minuteness, and too beautiful in her humility, to be overlooked in the poetry of art. If her tenderest and most delicate forms are worthy of admiration, she will demand from the artist his highest powers of design. If the living organizations of the teeming earth, upon which we hourly tread, are matchless in structure, and fascinating in color, the palette of the painter must surrender to them its choicest tints. In the foreground of the highest art, the snail-shell may inoffensively creep from beneath the withered leaf or the living blade; the harebell and the violet may claim a place in the sylvan dell; the moss may display its tiny frond, the gnarled oak or the twisted pine may demand the recognition of the botanist, while the castle wall rises in grandeur behind them, and the gigantic cliffs or the lofty mountain range terminate the scene.

If these views are sound, the man of taste will no longer endure slovenliness in art. He will demand truth as well as beauty in the landscape; and that painter may change his profession who cannot impress geology upon his rocks, and botany upon his plants and trees, or who refuses to display, upon his summer or his autumn tablet, the green crop as well as the growing and the gathered harvest. Thus enlarged in its powers and elevated in its purposes, the art of painting will be invested with a new character, demanding from its votaries higher skill and more extended knowledge. In former times, the minute and accurate delineation of nature was a task almost impossible, requiring an amount of toil which could hardly be repaid even when slightly performed; but science has now furnished art with the most perfect means of arresting, in their most delicate forms, every object, however minute, that can enter into the composition of a picture. These means are the arts of photography and stereoscopic re-combination, when rightly directed, and it is the object of the present chapter to shew how the artist may best avail himself of their valuable and indispensable aid.

Every country and district, and even different parts of the same district, have a Flora and Geology peculiar to themselves; and the artist who undertakes to represent its beauties owes to truth the same obligations as the botanist who is to describe its plants, or the mineralogist its rocks and stones. The critic could not, in former times, expect more details from his unaided pencil than it has generally furnished; but with the means now at his command, he must collect, like the naturalist, all the materials for his subject. After the camera has given him the great features of his landscape, he must appeal to it for accurate delineations of its minuter parts,—the trunks, and stems, and leafage of his trees—the dripping strata of its sandstone beds—the contortions of its kneaded gneiss, or the ruder features of its trap and its granite. For the most important of these details he will find the camera, as at present constructed, of little service. It is fitted only to copy *surfaces;* and therefore, when directed to solid bodies, such as living beings, statues, &c., it gives false and hideous representations of them, as I have shewn in a preceding chapter. It is peculiarly defective when applied to parts of bodies at different distances from it, and of a less diameter than the lens. The photograph of a cube taken by a lens of a greater diameter, will display *five* of its sides in a position, when its true perspective representation is simply a single square of its surface. When applied to trees, and shrubs, and flowers, its pictures are still more unsatisfactory. Every stem and leaf smaller than the lens, though absolutely opaque, is transparent, and leaves and stems behind and beyond are seen like ghosts through the photographic image.

This will be understood from Fig. 48, in which LL is the lens of the camera, AB the breadth of the trunk or stem of a tree less than LL in width. Draw LA, LB, touching AB in the points A, B, and crossing at C. Objects behind AB and placed within the angle ACB, will not have any images of them formed by the lens LL, because none of the rays which proceed from them can fall upon the lens, but objects placed within the angle ECF, however remote be their distance, will have images of them formed

* Sir Francis Chantrey, the celebrated sculptor, shewed me, many years ago, a Sketch-Book, containing numerous drawings which he had made with the *Camera Lucida*, while travelling from London to Edinburgh by the Lakes. He pointed out to me the flatness, or rather lowness, of hills, which to his own eye appeared much higher, but which, notwithstanding, gave to him the idea of a great elevation. In order to put this opinion to the test of experiment, I had drawings made by a skilful artist of the three Eildon hills opposite my residence on the Tweed, and was surprised to obtain, by comparing them with their true perspective outlines, a striking confirmation of the observation made by Sir Francis Chantrey.

by the lens. If D, for example, be a leaf or a fruit, or a portion of a branch, the rays which it emits will fall upon the portions Lm, Ln of the lens, determined by drawing Dm, Dn touching AB, and an image of it will be formed in the centre of the photographic image of AB, as if AB were transparent. This image will be formed by all the portions of the surface of the lens on which the shadow of AB, formed by rays emanating from D, would not fall. If the object D is mere remote, the shadow of

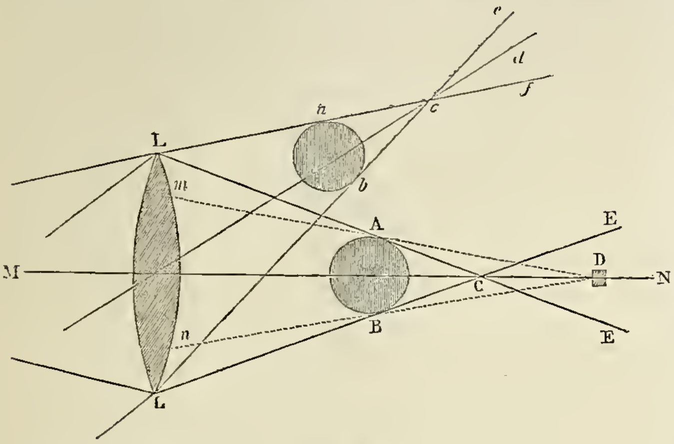

Fig. 48.

AB will diminish in size, and the image of the object will be formed by a greater portion of the lens. If the sun were to be in the direction MN, his image would appear in the centre of the trunk or stem, corresponding to AB, Fig. 49.

If the stem occupies any other position, *ab*, Fig. 48, in the landscape, objects, such as *d*, within the angle *ecf*, will have images of them formed within the corresponding portion of the trunk or stem. Hence, if AB, Fig. 49, represents the shadow of the stem across the lens LL, the image of any object, which if luminous would give this shadow, will be formed within the photographic image of the stem, and as every part of it may have branches, or leaves, or fruit behind it, its photographs will be filled with their pictures, which will have the same distinctness as other equidistant parts of the landscape.

These observations are applicable to the limbs and slender parts of animate and inanimate figures, when they are of a less size than the lens with which their photograph is taken. They will be transparent to all objects behind them, and their true forms and shades cannot be taken with the cameras now in use.*

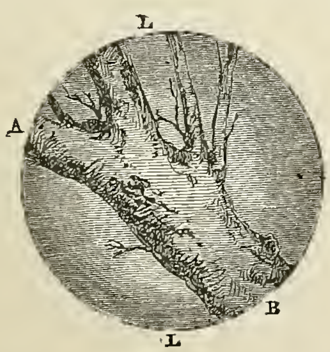

Fig. 49.

In order, therefore, to collect from nature the materials of his profession, the artist must use a camera with a lens not much larger than the pupil of his eye, and with such an instrument he will obtain the most correct drawings of the trunks and stems of trees, of the texture and markings of their bark, of the form of their leaves, and of all those peculiarities of structure and of leafage by which alone the trees of the forest can be distinguished. In like manner, he will obtain the most correct representations of the rocks and precipices, and the individual stones† which may enter into his picture,—of the plants which spring from their crevices or grow at their base, and of those flowers in their native grace and beauty, which hitherto he has either drawn from recollection, or copied from the formal representations of the botanist.

In addition to their correctness as true representations of natural forms, photographs have a peculiar value, for which no labor or skill on the part of the artist can compensate. In drawing the sketch of a landscape, or delineating the trees, rocks, and foliage which are near him, or the objects in the middle or remote distance, several hours must be spent.—During this period, the landscape and its individual parts are undergoing no inconsiderable change. A breeze may disturb the masses of his foliage, and bend his tree stems, and ruffle his verdure, and throw new reflected lights upon the waving crops, while every direct light is changing in intensity and direction during the culmination or descent of the sun. What he has delineated in the morning will hardly correspond with what he draws at noon, and the distances which at one time are finely marked in aerial perspective, will disappear, or even suffer inversion by variations in the intensity and position of the haze. If cottages, or castles, or buildings of any kind, enter into the picture, the shadows of their projections, and the lights upon their walls and roofs will, in sunshine, undergo still greater variations, and the artist will be perplexed with the anachronisms and inconsistencies *of his choicest materials.* The landscape thus composed in patches will, in its photograph, have a very different aspect, as much in its forms as in its lights and shadows. The truths of nature are fixed at one instant of time; the self-delineated landscape is embalmed amid the co-existing events of the physical and social world. If the sun shines, his rays throw their gilding on the picture. If the rain-shower falls, the earth and the trees glisten with its reflexions. If the wind blows, the partially obliterated foliage will display the extent of its agitation. The objects of still life, too, give reality and animation to the scene. The streets display their stationary chariots, the esplanade its military array, and the market-place its colloquial groups, while the fields are studded with the forms and attitudes of animal life. The incidents of time and the forms of space are thus simultaneously recorded, and every picture from the sober palette of the sun becomes an authentic chapter in the history of the world.‡

But, however valuable photography has become to the artist, science has recently given him another important auxiliary. In order to make this available, he must employ a small pocket binocular camera, to take double pictures to be united in the stereoscope. His trees will thus exhibit the roundness of their trunks and stems, the leaves and branches will place themselves at their proper distance, and he will discover the reason of peculiar effects which in the plane photograph he has been unable to understand. Seeing that his own picture is to be upon a plane surface, I can hardly expect to convince the artist that he will obtain more information by reproducing the original in relief. It is a fact, however, beyond dispute, that effects are produced by the stereoscopic union of two plane photographs which are invisible in the single picture. These effects, which are chiefly those of lustre and shade, are peculiarly remarkable

* By using large lenses, we may obtain the picture of an object within the picture of an opaque one in front of it; and with a telescope, we may see through opaque objects of a certain size. Many singular experiments may be made by taking photographs of solid objects, simple or compound, with lenses larger than the objects themselves.

† In a landscape by Mr. Waller Paton, called the "Highland Stream," now in the Edinburgh Exhibition, the foreground consists principally of a bed of waterworn stones, on the margin of a pool at the bottom of a waterfall. The stones are so exquisitely painted, that nature only could have furnished the originals. We may examine them at a few inches' distance, and recognise forms and structures with which we have been long familiar. A water-ousel, peculiar to Scottish brooks and rivers, perched upon one of them, looks as anxiously around as if a schoolboy were about to avail himself of the missiles at his feet.

‡ These views are well illustrated by the remarkable photographs of the Crimean war.

in Daguerreotype, and it is by no means easy to explain the cause. In a Daguerreotype, for example, of two figures in black bronze, with a high metallic lustre, it is impossible, by looking at the single picture, to tell the material of which they are made; but the moment they are united into stereoscopic relief their true character is instautly seeu. Iu a Daguerreotype of Alexander and Bucephalus, portious of the figure seem as if shaded with China ink of a nearly uniform tint, but when seen in relief the peculiar shade entirely disappears. The stereoscopic combiuation of two surfaces of different intensities, though of the same color, produces effects which have not yet been sufficiently studied. But, independently of these peculiarities, the artist will certainly derive more aid from his landscape in relief, and from the study of its individual parts, in their roundness and relative distances, than when he examines them in their plane representations. The shadows which the branches of leaves cast upon the trunks and stems of his trees he will be able to trace to the causes which produce them. Effects in outline, as well as in light and shadow, which may perplex him, will find an explanation in the relative distances aud differences of apparent magnitude of individual parts; and, after becoming familiar with his landscape in relief, as it exists in Nature, he cannot fail to acquire new principles and methods of manipulation. Nature flattened upon paper or metal, and Nature round and plump, as if fresh from the chisel of the Divine sculptor, must teach very different lessons to the aspiring artist.

The historical painter, or the more humble artist who delineates the scenes of common or domestic life, will derive from the photographic camera and the stereoscope advantages of equal importance. The hero, the sage, aud the martyr, drawn from living origiuals, may be placed in the scenes where they suffered, cr in the localities which they hallowed. The lawgiver of Egypt, though he exists only in the painter's eye, may take his place beside the giant flanks of Horeb or the awe-inspiring summit of Mount Sinai; and He whom we may not name may challenge our love and admiration amid the sun-painted scenes of his youth, of his miracles, and of his humiliation. The fragmeuts of ancieut grandeur which time and war have spared, the relics of bygone ages which have resisted the destrnctive elements, will, as the materials of art, give reality and truth to the pictorial history of times past, while the painter of modern evcuts cau command the most accurate representations not only of the costume, but of the very persous of the great men whose deeds he is called upon to immortalize. The heroes of the Crimean war, whether friends or foes, will be descried iu the trenches in which they fonght, amid the ranks which they led to victory, or among the wrecks of the fatal encounter in which they fell. The sun will thus become the historiographer of the future, and in the fidelity of his pencil and the accnracy of his chronicle, truth itself will be embalmed aud history cease to be fabnlous.

But even in the narrower, though not less hallowed sphere of domestic life, where the magic names of kindred and home are inscribed, the realities of stereoscopic photography will excite the most thrilling interest. In the trausition forms of his offspring, which link infancy with manhood, the parent will recognise the progress of his mortal career, and iu the successive phases which mark the sunset of life, the stripling iu his turn will read the lesson that his pilgrimage too has a term which must close. Nor are such delineations interesting only as works of art, or as incentives to virtue; they are instinct with associations vivid and endearing. The picture is connected with its original by sensibilitics peculiarly tender. It was the very light which radiated from her brow,—the ideutical gleam which lighted up her eye,—the hectic flush or the pallid hue that hung upon her cheek, which pencilled the cherished image, and fixed themselves for ever there.

CHAPTER XI.

APPLICATION OF THE STEREOSCOPE TO SCULPTURE, ARCHITECTURE, AND ENGINEERING.

To the arts of sculpture and architecture, the processes of binocular photography and stereoscopic combiuation are particularly applicable. The landscape painter has every day within his reach examples of the picturesque, the wild and the sublime in nature. In the fields which surround him, in the river, or even in the "brook that bubbles by," on the shore, on the heath, or on the mountain side, he has the choice of materials for every department of his art. The sculptor has no such advantage. Swathed in impenetrable drapery the human figure mocks his eager eye, and it is ouly by stolen glances, or during angel visit, few and far between, that he can see those divine forms which it is his business to portray. He must therefore quit his home and seek for the models of ancient and modern art. In the British Museum, in the Louvre, in the Vatican, and in the repositories of art in Berlin, Munich, and other European cities, he mnst spend months and years in the study of his profession. He must copy, day after day, those master triumphs of genius which the taste of ages has consecrated, and gather from their study the true principles of his art. Transferred to his owu studio, these copies will be his instructor and his guide. They will exhibit to him forms more than human, though human still, embodying all that is true and beautiful in what might be man. The value of these copies, however, depends on the skill and care with which they have been taken; but no labor however great, and uo power of drawing however masterly, can give even an approximate idea either of the outline or round of solid figures, whether siugle or in groups. Light and shade can alone evolve those muscular promiuences, or those soft and sphere-like relievos which give such power and beauty to forms, male and female; but how can an artist catch and fix those lights and shades which give relief to the parts which they illuminate or obscure? The light of the sun, even iu a cloudless sky, is ever varying in intensity, and the breadth and direction of the shadows which he casts are varying from hour to hour. In a cloudy day, the motion of the clouds, and the varying reflexions within his apartment, subject the lights aud shadows to constaut chauge. The portions of the drawing executed in the morniug will not harmonize with what is drawn at noon, or during the decline of day. We consider it, therefore, impossible to execute a drawing of a statue, or of a group of statues, from which the artist can have anything like an accurate idea of the forms which compose them.

From all these difficulties the sculptor has been relieved by the inventiou of the photographic process. He may thus take copies of statues in a few minutes, and take them iu all their aspects, and as seen at various distances, and in this manner he will obtain drawings with the shadows as they existed at a particular iustant, so that the lights aud shades, upon every individual part of the statue, will be correctly related to each other. But valuable as these drawings are, compared with those execnted by the pencil, their value becomes tenfold greater when they are takeu with the biuocular camera, and with small lenses, as already described. When combined in the stereoscope, he may reproduce the statue in relief, iu all its aspects, and of different sizes, and derive from its study the same advautages which the statue itself would have furnished. In one respect the creations of the stereoscope surpass the original. While the artist is surveying and drawing instrnction from the marble prototype, its lights and shadows, and consequently the delicate forms, couvex and coucave, by which they are produced, are constantly changing, whereas, in the stereoscopic statue, everything is fixed and invariable.* In taking busts and statues from the living subject, the sculptor will derive great advantage from the stereoscope. Double pictures of the whole, or of any portiou of the subject, may be taken and raised into relief, and from such binocular pictures, executed on one side of the globe, an artist, on the other side, may complete an admirable statue. The dyiug and the dead may thus be modelled without the rude contact of a mask, aud those noble forms perpetuated which affection or gratitude has endeared.

We must warn the scnlptor, however, against the employment of binocular pictures takeu with large lenses. Not only will the individual picture be deformed, bnt a double deformity will be induced by their union; and whether he copies from a statue

* A French sculptor has actually modelled a statue from the stereoscopic relief of binocular pictures.

or from a living figure, his work must be defective, even to an ordinary eye.

In architecture, and all those arts in which ornamental forms are given to solid materials, the binocular camera and the stereoscope will be found indispensable. The carvings of ancient, or medæval, or modern art may be copied and reproduced in relief, whatever be the material from which they have been cut. The rich forms of Gothic architecture, and the more classical productions of Greek and Roman genius, will swell the artist's portfolio, and possess all the value of casts. With the aid of the Kaleidoscope the modern artist may surpass all his predecessors. He may create an infinite variety of those forms of symmetry which enter so largely into the decorative arts; and if the individual forms, which constitute the symmetrical picture, are themselves solid, the binocular-kaleidoscopic pictures, taken photographically, will be raised into the relief of their component parts, or they may be represented directly to the eye in relief, by semi-lenses placed at the ocular extremities of the reflecting plates.* If the symmetrical forms are taken from lines in the same plane, no relief will be obtained from the kaleidoscopic pictures.

But it is not merely to the decorative parts of architecture that the stereoscope is applicable. The noblest edifices, whether of a civil, a religious, or a military character, which he could otherwise study only as a traveller, and represent in hurried and imperfect sketches, will, when taken binocularly, stand before him in their full relief and grandeur, reflecting to his eye the very lights and shadows which at a given hour the sun cast upon their walls.

In the erection of public buildings, hourly or daily photographs have been taken of them, to shew to the absent superintendent the progress of his work; but these pictures will be still more expressive if binocular ones are combined in the stereoscope.

To the engineer and the machinist, and the makers of instruments of all kinds, the stereoscope will be of inestimable value. The difficulty of representing machinery is so great that it is not easy to understand its construction or its mode of operation from plans and perspective views of it. The union of one or two binocular pictures of it, when thrown into relief, will, in many cases, remove the difficulty both of drawing and understanding it. Photographs of machinery, however, consisting of a number of minute parts at different distances from the eye, have, when taken by large lenses, all the defects which we explained in reference to trees and their branches and leaves. Supports and axles will be transparent, and the teeth of the wheels, and the small and distant parts of the mechanism, will be seen through all the nearer parts whose width is less than the diameter of the lens.

In taking a binocular picture of a machine or instrument consisting of various parts, that minute accuracy which is necessary to give the true form and expression of the human face is not required; but if it should happen that, in a correct binocular view of the object, parts are concealed which it should be useful to see, we must discover the binocular angle which will shew these parts in the two pictures, or, generally speaking, which will give the best view of the mechanism, and then adjust the lenses of the camera to give the desired representations of it. These observations will be found useful in obtaining stereoscopic views of the structures in carpentry and shipbuilding.

CHAPTER XII.

APPLICATION OF THE STEREOSCOPE TO NATURAL HISTORY.

In treating of those objects of natural history which enter into the composition of landscape scenery, such as trees, plants, and rocks, we have pointed out the method of having them accurately drawn for the stereoscope; but it is to the importance of stereoscopic photography in natural history as a science that we propose to devote the present Chapter.

When we reflect upon the vast number of species which have been described by zoologists, the noble forms of animated nature whether wild or domesticated, and the valuable services which many of them perform as the slaves of man, we can hardly attach too much importance to the advantage of having them accurately delineated and raised into stereoscopic relief. The animal painters of the present day,—the Landseers, the Cowpers, and the Ansdells, have brought this branch of their art to a high degree of perfection, but the subjects of their pencil have been principally dogs, horses, deer, and cattle, and a few other animals, with which they are well acquainted, and specimens of which were within their reach. To give accurate representations of giraffes, hyænas, and the rarer animals which are found alive only in zoological gardens and travelling caravans, is a more difficult task, and one which has been necessarily intrusted to inferior hands. In this branch of this art the photographer is perplexed with the difficulty of arresting his subject in a position of repose and in the attitude which he requires. But this difficulty will diminish as his materials become more sensitive to light; and means may be found for fixing, without constraint, certain animals in the desired position. We have seen the portrait of a dog taken with such minute accuracy that the slightest trace of any motion could not be perceived. Its master directed his attention to a piece of bread, and he stood firmly waiting for his reward. Considering truth as an essential element in all photographs, we are unwilling to council the artist to have recourse to a large lens for the purpose of accelerating his process by seizing his restless object in a single instant of time; but what cannot be tolerated in the human form may be permitted in animal portraiture as a necessary evil The divine lineaments aud delicate forms which in man the intellect and the affections conspire to mould, are concealed under the shaggy drapery of the world of instinct; and even if they existed and were perceived, could hardly be appreciated by those who have not studied its manners and submitted to its laws. But even in the present state of photography such a celerity of process has been attained that a distinguished amateur in Edinburgh has constructed a portable camera, which, by pulling a trigger, instantaneously records upon its sensitive retina the surf which is hurrying to the shore, or the stranger who is passing in the street. With such an instrument, in such hands, the denizens of the jungle or of the plains may be taken captive in their finest attitudes and in their most restless moods. Photographs thus obtained will possess a value of no ordinary kind, and when taken in the binocular camera and raised into relief by the stereoscope, will be valuable auxiliaries to the naturalist, and even to the painters and the poets whose works or whose lyrics may require an introduction to the brutes that perish.

In representing with accuracy the osteology and integuments of the zoological world—the framework which protects life, and to which life gives activity and power, the aid of the stereoscope is indispensable. The repose of death, and the sharp pencil which resides in the small lens, will place before the student's eye the skeleton., clothed or unclothed, in accurate perspective and true relief, while he contemplates with wonder, in their true apparent magnitude, the gigantic Mastodon, the colossal Megatherion, and the huge Diuornis, or examines the crushed remains of the lengthened Saurian, or the hollow footsteps which ancient life has impressed on the massive sandstone or the indurated clay.

In the other branches of natural history, ichthyology, ornithology, conchology, &c., the stereoscope will be found equally useful. In entomology, where insects are to be represented, the microscopic binocular camera must be used; and in order to prevent the legs; the antennæ, and other small parts of the objects from being transparent, and therefore spotted, with the images of objects or parts beyond them, as explained in a preceding chapter, the smallest lenses should be employed.

The roots and bulbs which are raised by the agriculturist and the horticulturist, the turnip, the beet, the carrot, and the onion; and the fruits raised in the orchard, on the wall, or in the hothouse, may be exhibited in all their roundness and solidity in the stereoscope; and as articles of commerce they might be purchased on the authority of their pictures in relief. The micros-

* See my Treatise on the Kaleidoscope, second edition, just published.

copic stereoscope will, in like manner, give accurate magnified representations in relief of grains and seeds of all kinds, and by comparing these with the representations of those of a standard form and quality, the purchaser may be enabled to form a better idea of their excellence than if he saw them with his own eyes, or had them in his own hands.

CHAPTER XIII.

APPLICATION OF THE STEREOSCOPE TO EDUCATIONAL PURPOSES.

The observations contained in the preceding chapters prepare us for appreciating the value of the stereoscope as an indispensable auxiliary in elementary as well as in professional education. When the scholar has learned to read, to write and to count, he has obtained only the tools of instruction. To acquire a general knowledge of the works of God and of man—of things common and uncommon—of the miracles of nature and of art, is the first step in the education of the people. Without such knowledge, the humblest of our race is unfit for any place in the social scale. He may have learned to read his Bible, and he may have read it after he had learned to read;—he may have commited to memory every sentence in the Decalogue;—he may have packed into the storehouse of his brain all the wisdom of Solomon, and all the divine precepts of a greater than Solomon, while he is utterly ignorant of everything above him, around him, and within him,—ignorant too, of the form, the magnitude, and the motions of his terrestrial home,—ignorant of the gigantic structures which constitute the material universe,—ignorant of the fabrics which industry prepares for his use, and of luxuries which commerce brings from the end of the earth and places at his door, —ignorant even of the wonderful operations of that beneficent commissariat, which is every moment, while he sleeps and dreams, elaborating the materials by which he is fed and clothed.

Were we to say it, that in our own country the teachers, so penuriously endowed by the State, are not much in advance of their pupils, we should err only in stating what is not universally true; and yet there are men of influence and character insisting upon the imposition of sectarian tests, and thus barricading our schools against the admission of the wisest and the fittest masters! And while every civilized community in the world is eagerly teaching their people, irrespective of religious creeds, the same bigots, civil and ecclesiastical, in our own country, have combined to resist the only system of education which can stem the tide of vice and crime which is desolating the land.

Missionary labor and reformatory institutions, valuable as they are, presuppose an educated community. To instruct and reform a race that can neither read their Bible nor derive knowledge from books, is a task beyond human achievment. The dearest interests of society, therefore, call loudly for *Secular Education*, —the greatest boon which philanthropy ever demanded from the State. The minister who, in the face of sectarian factions, dares not identify himself with a large legislative measure for the education of the people, and resigns office when he fails to carry it, prefers power to duty, and, if he ever possessed it, divests himself of the character of a statesman and patriot. He may be justified in punishing the law-breaker who cannot read his statues, but he is himself the breaker of laws of a higher order, and sanctioned by a higher tribunal.

If the education of the people is to be attempted either by partial or comprehensive legislation, the existing system is utterly inefficient. The teacher, however wisely chosen and well qualified, has not at his command the means of imparting knowledge. He may pour it in by the ear, or extract it from the printed page, or exhibit it in caricature in the miserable embellishments of the school-book but unless he teaches through the eye, the great instrument of knowledge, by means of truthful pictures, or instruments, or models, or by the direct exhibition of the products of nature and of art, which can be submitted to the scrutiny of the senses, no satisfactory instruction can be conveyed.* Every school, indeed, should have a museum, however limited and humble. Even from within its narrow spere objects of natural history and antiquities might be collected, and duplicates exchanged; and we are sure that many a chimney-piece in the district would surrender a tithe of its curiosities for the public use. Were the British Museum, and other overflowing collections, to distribute among provincial museums the numerous duplicates which they possess, they would gradually pass into the schools, and before a quarter of a century elapsed, museums would be found in every proper locality.

As we cannot indulge in the hope that any such boon will be conferred on our educational institutions, it becomes an important question how far it is possible to supply the defect by the means within our reach. The photographic process may be advantageously employed in producing accurate representations of those objects, both of nature and of art, which it would be desirable to describe and explain in the instruction of youth; but as experience has not yet taught us that such pictures will be permanent, and capable of resisting the action of time and the elements, it would be hazardous to employ them in the illustration of popular works. It is fortunate, however, that the new art of galvanography enables us, by a cheap process, to give to photographs the permanence of engravings, and to employ them in the illustration of educational works.†

But however much we may value such an auxiliary, representations or drawings, on a plane, of solids or combinations of solids at different distances from the eye, are in many cases unintelligible even to persons well informed; so that, on this ground alone, we cannot but appreciate the advantages to be derived from binocular pictures and their stereoscopic relievo, not only in the instruction of youth but in the diffusion of knowledge among all ranks of society.

One of the most palpable advantages to be derived from the illustration of school-books by pictures in relief, is the communication of correct knowledge of the various objects of natural history. If, as we have already shewn, the naturalist derives important assistance in his studies from correct representations of animated nature, how much more valuable must they be to the scholar who never saw, and may never see the objects themselves. In the department of zoology, the picture might frequently be taken from the living animal, standing before the camera in vigorous life and transcendent beauty; or when this cannot be done, from the fine specimens of zoological forms which adorn our metropolitan and provincial museums. The trees and plants, too, of distant zones, whether naked in their osteology, or luxurious in their foliage, would shew themselves in full relief;—the banyan, clinging with its hundred roots to the ground, — the bread-fruit tree, with its beneficent burden, —the cow tree, with its wholesome beverage, —the caoutchouc tree, yielding its valuable juice,—or the deadly upas, preparing its poison for the arrow of the savage or the poniard of the assassin.

With no less interest will the schoolboy gaze on the forms of insect life, which will almost flutter before him, and on the tenants of the air and of the ocean, defective only in the colors which adorn them. The structures ofe th inorganic world will equally command his admiration. The minerals which have grown in the earth beneath his feet, and the crystals which chemistry has conjured into being, will display to him their geometric forms, infinite in variety, and interesting from their rarity and value. Painted by the very light which streamed from them, he will see, in their retiring and advancing facets, the Kohinoor and other diamonds, and the huge rubies, and sapphires, and emeralds, which have adorned the chaplet of beauty, or sparkled in the diadem of kings. The gigantic productions of the earth will appeal to him with equal power,—the colossal granites,

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* "The importance of establishing a *permanent Museum of Education* in this country, with the view of *introducing improvements in the existing methods of instruction*, and specially directing public attention in a practical manner to the question of National Education, has been of late generally recognized."—*Third Report of the Commissioners for the Exhibition of* 1851, presented to both Houses of parliament, p. 37. Lond., 1856.

† This fine invention we owe to Mr. Paul Pretsch, late director of the Imperial Printing Office at Vienna. It is secured by patent and is now in practical operation in Holloway Place, Islington.

which have travelled in chariots of ice, and the rounded boulders, which have been transported in torrents of mud; and while he admires, in their strong relief, the precipices of ancient lava—the Doric colonnades of basalt—the upheaved and contorted strata beside them, and the undisturbed beds which no internal convulsions have shaken, he will stand appalled before the fossil giants of the primeval world that trod the earth during its preparation for man, and have been embalmed in stone to instruct and to humble him.

In acquiring a knowledge of physical geography, in which the grander aspects of nature arrest our attention, their stereoscopic representations will be particularly instructive. The mountain range, whether abrupt in its elevation, or retiring from our view,—whether scarred with peaks or undulating in outline,—the insulated mountain tipped with snow or glowing with fire,—the volcano ejecting its burning missiles,*—the iceberg fixed in the shore, or floating on the deep,—the deafening cataract,—the glacier and its moraines, sinking gently to the plains,—and even the colossal wave with its foaming crest, will be portrayed in the binocular camera, and exhibited in all the grandeur and life of nature.

The works of human hands,—the structures of civilization, will stand before the historian and the antiquary, as well as the student, in their pristine solidity, or in their ruined grandeur,—the monuments by which sovereigns and nations have sought to perpetuate their names,—the gorgeous palaces of kings,—the garish temples of superstition,—the humbler edifices of Christian faith,—the bastions and strongholds of war, will display themselves in the stereoscope as if the observer were placed at their base, and warmed by the very sun which shone upon their walls.

Although few of our village youth may become sculptors, yet the exhibition of ancient statues in their actual relief, and real apparent magnitude, cannot fail to give them salutary instruction and rational pleasure. To gaze upon the Apollo Belvidere,—the Venus de Medici,—the Laocoon, and the other masterpieces of ancient art, standing in the very halls which they now occupy; or to see the *chef d'œuvres* of Canova, Thorvaldsen, and Chantrey, or the productions of living artists in their own studio, with the sculptor himself standing by their side, will excite an interest of no ordinary kind.

From the works of the architect, the engineer, and the mechanist, as exhibited in full relief, the student, whether at our schools or colleges, will derive the most valuable instruction. The gigantic aqueducts of ancient and modern times,—the viaducts and bridges which span our valleys and our rivers, and the machinery in our arsenals, factories, and workshops, will be objects of deep interest to the general as well as the professional inquirer.

There is yet another application of the stereoscope to educational purposes, not less important than those which have been mentioned. In the production of diagrams representing instruments and apparatus, which cannot be understood from drawings of them on a plane, it will be of incalculable use to the teacher to have stereoscopic pictures of them. In every branch of physical science, diagrams of this kind are required. When they are intended to represent apparatus and instruments, either for illustrating known truths, or carrying on physical researches, binocular pictures can be easily obtained ; but when the diagrams have not been taken from apparatus, but are merely combinations of lines, we can obtain binocular photographs of them only from models constructed on purpose. These models will give binocular representations in various azimuths, so that the true position of planes at different inclinations, and lines at various angles with each other, and at different distances from the eye, will be readily apprehended. Astronomical diagrams, in which orbits, &c., may be represented by wires, and optical figures, in which the rays may be formed by threads or wires, would be thus easily executed.

Among the binocular diagrams, consisting of white lines upon a black ground, which have been executed in Paris, there is one representing the apparatus in which a ray of light, polarized by reflexion from a glass plate, passes through a crystallized film perpendicular to the plane of the paper, and is subsequently analyzed by reflexion from another plate at right angle to the following plate. This diagram, when placed in relief by the stereoscope, gives as correct an idea of the process as the apparatus itself.

As an auxiliary in the investigation of questions of difficulty and importance, both in physics and metaphysics, the stereoscope is particularly valuable. It enables us to place in its true light the celebrated theory of vision on which Bishop Berkley reared the ideal philosophy, of which he was the founder, and it gives us powerful aid in explaining many physical phenomena which have long baffled the ingenuity of philosophers. It would be out of place to give any account of these in a work like this, but there is one so remarkable, and at the same time so instructive, as to merit special notice. In order to exhibit, by means of *three* diagrams, a solid in relief and hollow at the same time, which had not been previously done, I executed three drawings of the frustum of a cone, resembling those in Fig. 31, so that the *left*-hand one and the middle one gave the *hollow* cone, while the *middle* one and the *right*-hand one gave the *raised* cone. Having their summits truncated, as in the figure, the cones exhibit, in the one case, a circle at the bottom of the hollow cone, and in the other, a circle on the summit of the raised cone. When these three diagrams† are placed in an open lenticular stereoscope, or are united by the convergency of the optical axes, so that we can not only see the *hollow* and the *raised* cones, but the flat drawing on each side of them, we are enabled to give an ocular and experimental proof of the cause of the large size of the horizontal moon, of her small size when in the meridian or at a great altitude, and of her intermediate altitudes,—phenomena which had long perplexed astronomers, and which Dr. Berkeley, rejecting previous and well-founded explanations, ascribed to the different degreess of brightness of the moon in these different positions.

As the circular summit of the *raised* cone *appears* to be *nearest* the eye of the observer, the summit of the *hollow* cone *farthest* off, and the similar central circle in the flat drawing on each side, at an intermediate distance, the apparent distances from the different and equal circles will represent the apparent distance of the moon in the *zenith*, or very high in the elliptical celestial vault,—the same distance when she is in the *horizon*, and the same when at an intermediate altitude. Being in reality of exactly the same size, and at the same distance from the eye, these circular summits, or sections of the cone, are precisely in the same circumstances as the moon in the three positions already mentioned. If we now contemplate them in the lenticular stereoscope, we shall see the circular summit of the *hollow* cone the *largest*, like the *horizontal* moon, because it *seems* to be the *greatest* distance from the eye,—the circular summit of the *raised* cone the *smallest*, because it appears at the *least* distance, like the *zenith* or culminating moon,—and the circular summits of the flat cones on each side, of an *intermediate* size, like the moon at an *intermediate* altitude, because their distance from the eye is intermediate. The same effect will be equally well seen by placing three small wafers of the same size and color on the square summits of the drawings of the quadrangular pyramids, or more simply, by observing the larger size of the square summit of the hollow pyramid.

This explanation of the cause of the increased size of the horizontal moon is rigorously correct. If any person should suspect that the circles which represent the moon are unequal in size, or

* An accomplished traveller, the Rev. Mr. Bridges, who ascended Mount Etna for the purpose of taking Talbotype drawings of its scenery, placed his camera on the edge of the crater to obtain a representation of it. No sooner was the camera fixed and the sensitive paper introduced, than an eruption took place, which forced Mr. Bridges to quit his camera in order to save his life. When the eruption closed, he returned to collect the fragments of his instrument, when to his great surprise and delight, he found that his camera was not only uninjured, but contained a picture of the crater and its eruption.

† A binocular slide, copied from the one originally designed by myself, forms No. 27 of the series of white-lined diagrams upon a black ground executed in Paris. The drawings, however, are too large for the common stereoscope.

are at different distances from the eye, they have only to cut the diagram into three parts, and make each drawing of the frustum of the cone occupy a different place in the binocular slide, and they will obtain the very same results. Hence we place beyond a doubt the incorrectness of Dr. Berkeley's theory of the size of the horizontal moon,—a theory to which the stereoscope enables us to apply another test, for if we make one or more of these circles less bright than the rest, no change whatever will be produced in their apparent magnitude.

CHAPTER XIV.

APPLICATION OF THE STEREOSCOPE TO PURPOSES OF AMUSEMENT.

Every experiment in science, and every instrument depending on scientific principles, when employed for the purpose of amusement, must necessarily be instructive. "Philosophy in sport" never fails to become "Science in earnest." The toy which amuses the child will instruct the sage, and many an eminent discoverer and inventor can trace the pursuits which immortalize them to some experiment or instrument which amused them at school. The soap bubble, the kite, the balloon, the water wheel, the sun-dial, the burning-glass, the magnet, &c., have all been valuable incentives to the study of the sciences.

In a list of about 150 binocular pictures issued by the London Stereoscopic Company, under the title of "Miscellaneous Subjects of the 'Wilkie' character," there are many of an amusing kind, in which scenes in common life are admirably represented. Following out the same idea, the most interesting scenes in our best comedies and tragedies might be represented with the same distinctness and relief as if the actors were on the stage. Events and scenes in ancient and modern history might be similarly exhibited, and in our day, binocular pictures of trials, congresses, political, legislative, and religious assemblies, in which the leading actors were represented, might be provided for the stereoscope.

For the purpose of amusement, the photographer might carry us even into the regions of the supernatural. His art, as I have elsewhere shewn, enables him to give a spiritual appearance to one or more of figures, and to exhibit them as "thin air" amid the solid realities of the stereoscopic picture. While a party is engaged with their whist or their gossip, a female figure appears in the midst of them with all the attributes of the supernatural. Her form is transparent, every object or person beyond her being seen in shadowy but distinct outline. She may occupy more than one place in the scene, and different portions of the group might be made to gaze upon one or other of the visions before them. In order to produce such a scene, the parties which are to compose the group must have their portraits nearly finished in the binocular camera, in the attitude which they may be supposed to take, and with the expression which they may be supposed to assume, if the vision were real. When the party have nearly sat the proper length of time, the female figure, suitably attired, walks quickly into the place assigned her, and after standing a few seconds in the proper attitude, retires quickly, or takes as quickly, a second or even a third place in the picture if it is required, in each of which she remains a few seconds, so that her picture in these different positions may be taken with sufficient distinctness in the negative photograph. If this operation has been well performed, all the objects immediately behind the female figure, having been, previous to her introduction, impressed upon the negative surface, will be seen through her, and she will have the appearance of an aerial personage, unlike the other figures in the picture. This experiment may be varied in many ways. One body may be placed within another, a chicken, for example, within an egg, and singular effects produced by combining plane pictures with solid bodies in the arrangement of the persons and things placed before the binocular camera. Any individual in a group may appear more than once in the same picture, either in two or more characters, and no difficulty will be experienced by the ingenious photographer in giving to these double or triple portraits, when it is required, the same appearance as that of the other parties who have not changed their place. In groups of this kind curious effects might be produced by placing a second binocular slide between the principal slide and the eye, and giving it a motion within the stereoscope. The figures upon it must be delineated photographically upon a plate of glass, through which the figures on the principal slide are seen, and the secondary slide must be so close to the other that the figures on both may be distinctly visible, if distinct vision is required for those which are to move.

Another method of making solid figures transparent in a photograph has been referred to in the preceding chapter, and may be employed in producing amusing combinations. The transparency is, in this case, produced by using a large lens, the margin of which receives the rays which issue from bodies, or parts of bodies, situated *behind* other bodies or parts of bodies, whose images are given in the photograph. The body thus rendered transparent must be less in superficial extent than the lens, and the body seen through it must be so far behind it that rays emanating from it would fall upon some part of the lens, the luminosity of this body on the photograph being proportional to the part of the surface of the lens upon which the rays fall. This will be readily understood from Figs. 48 and 49, and their description, and the ingenious photographer will have no difficulty in producing very curious effects from this property of large object-glasses.

One of the most interesting applications of the stereoscope is in combining binocular pictures, constructed like the plane picture, used in what has been called *cosmorama* for exhibiting dissolving views. These plane pictures are so constructed, that when we view them by reflected light, as pictures are generally viewed, we see a particular scene, such as the Chamber of Deputies in its external aspect; but when we allow no light to fall upon it, but view it by transmitted light, we see the interior of the building brilliantly lighted up, and the deputies listening to the debate. In like manner, the one picture may represent two armies in battle array, while the other may represent them in action. A cathedral in all its architectural beauty may be combined with the same building in the act of being burned to the ground; or a winter scene covered with snow may be conjoined with a landscape glowing with the warmth and verdure of summer. In the cosmorama, the reflected light which falls upon the front of the one picture is obtained by opening a lid similar to that of the stereoscope, as shewn at CD, Fig. 14, while another lid opening behind the picture stops any light which might pass through it, and prevents the second picture from being seen. If, when the first picture is visible, we gradually open the lid behind it, and close the lid CD before it, it gradually disappears, or *dissolves*, and the second picture gradually appears till the first vanishes and the second occupies its place. A great deal of ingenuity is displayed by the Parisian artists in the composition of these pictures, and the exhibition of them, either in small portable instruments held in the hand, or placed on the table, or on a great scale, to an audience, by means of the oxygen and hydrogen light, never fails to excite admiration.

The pictures thus exhibited, though finely executed, have only that degree of relief which I have called *monocular*, and which depends on correct shading and perspective; but when the dissolving views are obtained from binocular pictures, and have all the high relief given them by their stereoscopic combination, the effect must be singularly fine.

Very interesting and amusing effects are produced by interchanging the right and left eye pictures in the stereoscope. In general, what was formerly convex is now concave, what was round is hollow, and what was near is distant. The effect of this interchange is finely seen in the symmetrical diagrams, consisting of white lines upon black ground, such as Nos. 1, 5, 9, 12, 18 and 27 of the Parisian set; but when the diagrams are not symmetrical, that is, when the one half is not the reflected image of the other, such as Nos. 26, &c., which are transparent polygonal solids, formed as it were by white threads or wires, no effect beyond a slight fluttering, is perceived. As the right and left eye pictures are inseparable when on glass or silver

plate, the experiments must be made by cutting in two the slides on Bristol board. This, however, is unnecessary when we have the power of uniting the pictures by the convergency of the optic axes to a nearer point, as we obtain, in this case, the same effect as if we had interchanged the pictures. The following are some of the results obtained in this manner from well-known slides:—

In single portraits no effect is produced by the interchange of the right and left eye pictures. If any loose part of the dress is in the foreground it may be carried into the distance, and *vice versa.* In one portrait, the end of the hat-band, which hung down loosely behind the party, was made to hang in front of it.

In pictures of streets or valleys, and other objects in which the foreground, and the middle-ground with the distance, without any break, no effect is produced by the interchange. Sometimes there is a little bulging out of the middle distance, injurious to the monocular effect.

In the binocular picture of the Bridge of Handeck, the Chalet in the foreground retires, and the middle distance above it advances.

In the picture of the sacristy of Notre Dame, the sacristy retires within the cathedral.

In the Maison des Chapiteaux at Pompeii, the picture is completely inverted, the objects in the distance coming into the foreground.

In the Daguerreotype of the Crystal Palace, the water in the foreground, with the floating plants, retires and takes an inclined position below a horizontal plane.

In the binocular picture of the lower glacier of Rosenlaui, the roof of the ice-cave becomes hollow, and the whole foreground is thrown into a disordered perspective.

In Copeland's Venus, the arm holding the bunch of grapes is curiously bent and thrown behind the head, while the left arm advances before the child.

In the picture of the Greek Court in the Crystal Palace, the wall behind the statues and columns advances in front of them.

The singular fallacy in vision which thus takes place is best seen in a picture where a number of separate articles are placed upon a table, and in other cases where the judgment of the spectator is not called upon to resist the optical effect. Although the nose of the human face should retire behind the ears yet no such effect is produced, as all the features of the face are connected with each other, but if the nose and ears had been represented separately in the position which they occupy in the human head, the nearer features would have retired behind the more remote ones, like the separate articles on a table.

We shall have occasion to resume this subject in our concluding chapter on the fallacies which take place in viewing solids, whether raised or hollow, and whether seen by direct or inverted vision.

CHAPTER XV.

ON THE PRODUCTION OF STEREOSCOPIC PICTURES FROM A SINGLE PICTURE.

Those who are desirous of having stereoscopic *relievos* of absent or deceased friends, and who possess single photographic portraits of them, or even oil paintings or miniatures, will be anxious to know whether or not it is possible to obtain from one plane picture another which could be combined with it in the stereoscope; that is, if we consider the picture as one seen by either eye alone, can we by any process obtain a second picture as seen by the other eye? We have no hesitation in saying that it is impossible to do this by any direct process.

Every picture, whether taken photographically or by the eye, is necessarily a picture seen by one eye, or from one point of sight; and, therefore, a skilful artist, who fully understands the principle of the stereoscope, might make a copy of any picture as seen by the other eye, so approximately correct as to appear in relief when united with the original in the stereoscope; but the task would be a very difficult one, and if well executed, so as to give a relievo without distortion, the fortune of the painter would be made.

When the artist executes a portrait, he does it from one point of sight, which we may suppose fixed, and corresponding with that which is seen with his *left* eye. If he takes another portrait of the same person, occupying exactly the same position, from another point of sight, two and a half inches to the right of himself, as seen with his *right* eye, the two pictures will differ only in this, that each point in the head, and bust, and drapery, will, in the second picture, *be carried farther to the left of the artist* on the plane of representation. The points which project most, or are more distant from that plane, will be carried farther to the left than those which project less, the extent to which they are carried being proportional to the amount of their projection, or their distance from the plane. But since the painter cannot discover from the original or left-eye plane picture the degree of prominence of the leading points of the head, the bust, and the drapery, he must work by guess, and submit his empirical touches, step by step, to the judgment of the stereoscope. In devoting himself to this branch of the art he will doubtless acquire much knowledge and dexterity from experience, and may succeed to a very considerable extent in obtaining pictures in relief, if he follows certain rules, which we shall endeavor to explain.

If the given portrait, or picture of any kind, is not of the proper size for the stereoscope, it must be reduced to that size, by taking a photographic copy of it, from which the right-eye picture is to be drawn.

In order to diminish the size of the diagram, let us suppose that the plane on which the portrait is taken touches the back of the head, and is represented in section by AB, Fig. 50. We

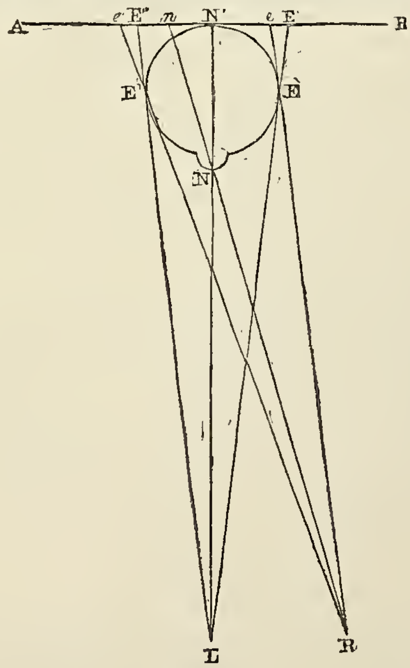

Fig. 50.

must now assume, under the guidance of the original, a certain form of the head, whose breadth from ear to ear is EE'', N being the point of the nose in the horizontal section of the head, E'' N E N', passing through the nose N, and the lobes E E'' of the two ears. Let L, R be the left and right eyes of the person viewing them, and L N the distance at which they are viewed, and let lines be drawn from L and R, through L, N, E and E'', meeting the plane AB on which the portrait is taken in *e*, E''', *n*, N', *e*, and E. The breadth, E''' *e*', and the distances of the nose from the ears N' E', N' E''', being given by measurement of the photograph suited to the stereoscope, the distances N N', E E', E'' E''' may be approximately obtained from the known form of the human head, either by projection or calculation. With these data, procured as correctly as we can, we shall, from the position of the

nose n, as seeu by the right eye R, have the formula

$$\mathrm{N}'n = \frac{\mathrm{LR} \times \mathrm{N\,N}'}{\mathrm{N\,L}}$$

The distance of the *right* ear e', from the right-eye picture, will be,

$$n\,e' = e'\mathrm{N} - \mathrm{N}'n; \text{ and as } \mathrm{E}'e - \frac{\mathrm{L\,R} \times \mathrm{E\,E}'}{\mathrm{E\,L}}.$$

The distance of the *left* car e, in the right-eye picture, from the nose n, will be

$$n\ e = \mathrm{N}'n + \mathrm{N}'\mathrm{E}' - \mathrm{E}'e.$$

In order to simplify the diagram we have made the original, or left-eye picture, a front view, in which the nose is in the middle of the face, and the line joining the ears parallel to the plane of the picture.

Wheu the positiou of the nose aud the ears has been thus approximately obtained, the artist may, in like manner, determine the place of the pupils of the two eyes the point of the chin, the summit of the eyebrows, the prominence of the lips, and the junction of the nose with the teeth, by assuming, under the guidance of the original picture, the distauce of these different parts from the plane of projectiou. Iu the same way other leading points in the figure aud drapery may be found, and if these points are determined with tolerable accnracy the artist will be able to draw the features in their uew place with such correctness as to give a good result in the stereoscope.

Iu drawing the right-eye picture the artist will, of course, employ as the grouudwork of it a faint photographic impression of the original, or left-eye picture, and he may, perhaps, derive some advantage from placiug the origiual, when before the camera, at such an iucliuation to the axis of the lens as will prodace the same diminution iu the horizontal distance betweeu any two points in the head, at a mean distance betweeu N aud N′, as projected upon the plane A B. The line N′ E‴, for example, which in the left-eye photograph is a representatiou of the cheek N E″, is reduced, iu the right-eye photograph, to $n\,e'$, and therefore, if the photograph on A B, as seen by the right eye, were placed so obliquely to the axis of the lens that N′e was reduced to $n\,e'$, the copy obtained in the camera would have au approximate resemblance to the right-eye picture required, and might be a better groundwork for the right-eye picture than au accurate copy of the photograph ou A B, takeu when it is perpendicular to the axis of the lens.

In preparing the right-eye picture, the artist, in place of using paint, might use very dilute solutions of aceto-nitrate of silver, begiuuiug with the faintest tint, aud darkeuing these with light till he obtained the desired effect, aud, when necessary, diminishing the shades with solutions of the hypo-sulphite of soda. When the picture is fiuished, aud fouud satisfactory, after cxamining its relief in the stereoscope, a negative picture of it should be obtained in the camera, aud positive copies takeu, to form, with the original photographs, the pair of binocular portraits required.

CHAPTER XVI.

ON CERTAIN FALLACIES OF SIGHT IN THE VISION OF SOLID BODIES.

In a preceding chapter I have explained a remarkable fallacy of sight which takes place in the stereoscope when we interchange the binocular pictures, that is, when we place the right-eye picture on the left side, and the left-eye picture on the right side. The objects iu the foreground of the picture are thus thrown iuto the background, aud, *vice versa*, the same effect, as we have seen, takes place when we unite the binocular pictures, in their usual position, by the ocular stereoscope, that is, by converging the optic axes to a point between the eye and the pictures. In both these cases the objects are only the plaue representations of solid bodies, and the change which is produced by their nnion is not in their form but in their positon. In certain cases, however, when the object is of some magnitude in the picture, the form is also changed in consequence of the inverse position of its parts. That is, the drawings of objects that are naturally convex will appear coucave, and those which are naturally concave will appear convex.

In these phenomena there is no mental illusion in their production. The two similar points in each picture, if they are nearer to one another than other two similar points, mnst, in conformity with the laws of vision, appear uearer the eye wheu combined in the common stereoscope. Wheu this change of place and form does not appear, as in the case of the human figure, previously explained, it is by a mental illusion that the law of vision is controlled.

The phenomena which we are about to describe are, in several respects, different from those to which we have referred. They are seen in *monocular* as well as in *binocular* vision, and they are produced in all cases nnder a mental illnsion, arising either from causes over which we have no control, or voluutarily created and maintained by the observer. The first notice of this class of optical illusion was given by Aguilouius in his work on optics, to which we have already had occasion to refer.* After proving that convex and concave surfaces appear plane when seen at a considerable distance, he shews that the same surfaces, when scen at a moderate distance, frequently appear what he calls *converse*, that is, the concave convex, and the convex concave. This conversion of forms, he says, is often seen in globes or balls which are fixed on the walls of fortifications, aud he ascribes the phenomena to the circumstance of the miud being imposed upon from not knowiug in what direction the light falls upon the body. He states that a coucavity differs from a convexity only in this respect, that if the shadow is ou the same side as that from which the light comes it is a concavity aud if it is on the opposite side, it is a couvexity. Aguilonius observes also, that iu pictures imitating nature, a similar mistake is committed as to the form of surfaces. He supposes that a circle is drawn upou a table and shaded on one side so as to represent a convex or a concave surface. Wheu this shaded circle is seen at a great distance, it appears a plane surface, uotwithstanding the shadow on one side of it; but when we view it at a short distance, and suppose the light to come from the same side of it as the part not in shadow, the plane circle will appear to be a convexity, and if we suppose the light to come from the same side as the shaded part, the circle will appear to be a concavity.

More than half a ceutury after the time of Aguilonius, a member of the Royal Society of London, at one of the meetings of that body, wheu looking at a guinea through a componnd microscope which inverted the object, was surprized to see the head npon the coin depressed, while other members were not subject to this allusion.

Dr. Philip Gmelin† of Wurtemberg, having learned from a friend, that when a common seal is viewed through a compound microscope, the depressed part of the seal appeared elevated, and the elevated part depressed, obtained the same result, and found, as Aguilonius did, that the effect was owing to the iuversion of the shadow by the microscope. One person often saw the phenomena aud auother did not, and no effect was produced when a raised object was so placed between two windows as to be illuminated on all sides.

In 1780 Mr. Rittenhouse, an American writer, repeated these experiments with an iuverting eye-tube, consisting of two lenses placed at a distance greater the sum of their focal lengths, and he found that a reflected light was thrown on a cavity, in a direction opposite to that of the light which came from his window, the cavity was raised into an elevation by looking through a tube without any lens. In this experiment the shadow was inverted, just as if he had looked through his inverting eye-tube.

In studying this subject I observed a number of singular phenomena, which I have described in my *Letters on Natural Magic*, ‡ but as they were uot seeu by binocular vision I shall mentiou only some of the more important facts. If we take one of the intaglio moulds used by the late Mr. Henuing for his bas reliefs, and direct the eye to it steadily, without noticing surrounding objects, we may distiuctly see it as a bas-relief. After a little practice I have succeeded in raising a

*See Chap i. p. 267.

† *Phil. Trans.* 1744.

‡ *Letter* v. pp. 98-107. See also the *Edinburgh Journal of Science*, Jan. 1826, vol. iv. p. 99.

complete hollow mask of the human face, the size of life, into a projecting head. This result is very surpising to those who succeed in the experiment, and it will no doubt be regarded by the sculptor who can use it as an auxiliary in his art.

Till within the last few years, no phenomeuon of this kind, either as seen with one or with two eyes, had been noticed by the casual observer. Philosophers alone had been subject to the illusion, or had sujected others to its influence. The following ease, however, which occurred to Lady Georgiana Wolff, possesses mnch interest, as it could not possibly have been produced by any voluntary effort. "Lady Georgiana," says Dr. Joseph Wolff in his *Journal*, "observed a curious optical deception in the saud, about the middle of the day, when the suu was strong: *all the foot-prints, and other marks that are indented in the sand, had the appearance of being raised out of it.* At these times there was such a glare, that it was unpleasaut for the eye."* Haviug no doubt of the correctness of this observation, I have often endeavored, though in vaiu, to witness so remarkable a phenomenon. Iu walkiug, however, in the month of March last, with a friend on the beach at St. Audrews, the phenomenon presented itself, at the same instant, to myself and to a lady who was uuacquainted with this class of illusions. The impressions of the feet of men and of horses were distinctly raised out of the sand. In a short time they resumed their hollow form, but at different places the phenomeuon again presented itself, sometimes to the lady, and sometimes to both of us simultaneously. The sun was near the horizon on our left hand, aud the white surf of the sea was on our right, strongly reflecting the solar rays. It is very probable that the illusion arose from our considering the light as coming from the white surf, in which case the shadows in the hollow foot-prints were such as could only be produced by foot-prints raised from the sand, as if they were in relief. It is possible that, when the phonomenon was observed by Lady Georgiana Wolff, they may have been some source of direct or reflected light opposite to the sun, or some unusual brightuess of the clouds, if there were any iu that quarter, which gave rise to the illusion.

When these illusions, whether monocular or binocular, are produced by inversion of the shadow, either real or supposed, they are instantly dissipated by holding a pin in the field of view, so as to indicate by its shadow the real place of the illuminating body. The figure will appear raised or depressed, according to the knowledge which we obtain of the source of light, by introducing or withdrawing the pin. When the inversion is produced by the eye-piece of a telescope, or a compound microscope, in which the field of view is necessarily small, we cannot see the illuminating body of the convex or concave object (the cameo or intaglio) at the same time; but if we use a small inverting telescope, $1\frac{1}{2}$ or 2 inches long, such as that shewn at M N, Fig. 36, we obtain a large field of view, and may see at the same time the object and a candle placed beside it. In this case the illusion will take place according as the candle is seen beside the object or withdrawn.

If the object is a white tea-cup, or bowl, however large, and if it is illumiuated from behind the observer, the reflected image of the window will be in the concave bottom of the tea-cup, aud it will not rise into a convexity if the illumination from surrounding objects is uniform; but if the observer moves a little to one side, so that the reflected image of the window passes from the centre of the cup, then the cup will rise iuto a convexity, when seen through the iuverting telescope, in consequence of the position of the luminous image, which could occupy its place only npon a convex surface. If the the concave body were cut out of a piece of chalk, or pure unpolished marble, it would appear neither convex nor concave, but flat.

Very singular illusions take place, both with one and two eyes, when the object, whether concave or convex, is a hollow or an elevation in or upon a limited or extended surface — that is, whether the surface occupies the whole visible field, or only part of it. If we view, through the iuverting telescope or eye-piece, a dimple or a hemispherical cavity in a broad piece of wood laid horizontally on the table, and illuminated by *quaquaversus light*, like that of the sky, it will instantly rise into elevation, the end of the telescope or eye-piece resting on the surface of the wood. The change of form is therefore, not produced by the inversion of the shadow, but by another cause. The surface in which the cavity is made is obviously iuverted as well as the cavity, that as it now looks downward in place of upward; but it does not appear so to the observer leaning npon the table, and resting the end of his eye-piece upon the wooden surface in which the cavity is made. The surface seems to him to remain where it was, and still to look upwards, in place of looking dowuwards. If the observer strikes the wooden surface with the end of the eye-piece, this conviction is strengthed, and he believes that it is the lower edge of the field of view, or object-glass, that strikes the apparent wooden surface or rest upon it, whereas the wooden surface has been inverted, and optically separated from the lower edge of the object-glass.

In order to make this plaiuer, place a pen upon a sheet of paper with the quill eud nearest you, and view it through the inverting telescope: The quill end will appear farthest from you, and the paper will not appear inverted. In like manner, the letters on a printed page are inverted, the top of cach letter being nearest the observer, while the paper seems to retain its usual place. Now in both these cases the paper is inverted as well as the quill and the letters, and in reality the image of the quill and of the pen, and of the lower end of the letters, is nearest the observer. Let us next place a tea-cup on its side upon the table, with its cavity toward the observer, and view it through the invertiug telescope. It will rise into a convexity, the nearer margin of the cup appearing farther off thau the bottom. If we place a short pen within the cup, measuring as it were it depth, and having its quill eud nearest the observer, the pen will be inverted, in correspondence with the conversion of the cup into a convexity, the quill end appearing more remote, like the margin of the cup which it touches, and the feather end next the eye like the summit of the convex cup on which it rests.

In these experiments, the conversiou of the concavity into a convexity depends on two separate illusious, one of which springs from the other. The *first* illusion is the erroneous conviction that the surface of the table is looking upwards as usual, whereas it is really iuverted; and the *second* illusion, which arises from the first, is, that the *nearest* point of the object appears *farthest* from the eye, whereas it is *nearest* to it. All these observations are equally applicable to the vision of convexities, and hence it follows, that the conversion of relief, eaused by the use of an inverting eye piece, is not preduced directly by the inversion, but by an illusion arising from the inversion, in virtue of which we believe that the remotest side of the convexity is uearer our eye than the side next us.

In order to demonstrate the correctness of this explanation, let the hemispherical cavity be made in a stripe of wood, narrower than the field of the inverting telescope with which it is viewed. It will then appear really iuverted, and free from both the illusions which formerly took place. The thickness of the stripe of wood is now distinctly seen, and the inversion of the surface, which now looks downward, immediately recognised. The edge of the cavity now appears *nearest* the eye, as it really is, and *the concavity, though inverted, still appears a concavity.* The same effect is produced when a convexity is placed on a narrow stripe of wood.

Some curious phenomena take place when we view, at different degrees of obliquity, a hemispherical cavity raised into a convexity. At every degree of obliquity from 0° to 90°, that is, from a vertical to a horizontal view of it, *the elliptical margin of the convexity will always be visible*, which is impossible in a real convexity, and the elevated apex will gradually sink till the elliptical margin becomes a straight line, and *the imaginary convexity completely levelled.* The struggle between truth aud error is here so singular, that while one part of the object has become concave, the other part retains its canvexity!

In like manner, when a convexity is seen as a concavity, the concavity loses its true shape as it is viewed more and more obliquely, till its remote elliptical margin is encroached upou, or eclipsed, by the apex of the convexity; and towards an in-

* *Journal*, 1839, p. 189.

clination of 90° the concavity disappears altogether, under circumstances analogous to those already described.

If in place of using an invertiug telescope we invert the concavity, by lookiug at its inverted image in the focus of a convex lens, it will sometimes appear a convexity and sometimes not. In this form of the experiment the image of the concavity, and consequently its apparent depth, is greatly diminished, and therefore any trivial cause, such as a preconception of the mind, or an approximation to a shadow, or a touch of the concavity by the point of the finger, will either produce a conversion of form or dissipate the illusion when it is produced.

In the preceding Chapter we have supposed the convexity to be high and the concavity deep and circular, and we have supposed them also to be shadowless, or illumiuated by a *quaqurversus* light, such as that of the sky iu the open fields. This was doue in order to get rid of all secondary causes which might interfere with aud modify the normal cause, wheu the concavities are shallow, aud the convexities low aud have distinct shadows, or when the concavity, as in seals, has the shape of an animal or any body which we are accustomed to see in relief.

Let us uow suppose that a strong shadow is thrown upon the concavity. In this case the normal experiment is much more perfect aud satisfactory. The illusiou is complete and invariable when the concavity is iu or upou au extended surface, and it as invariably disappears, or rather is not produced, when it is in a narrow stripe.

In the secondary forms of the experiment, the inversion of the shadow becomes the principle cause of the illusion; but iu order that the result may be invarible, or nearly so, the concaviities must be shallow and the convexities but slightly raised. At great obliquities, however, this cause of the conversion of form ceases to produce the illusion, and in varying the inclination from 0° to 90° the cessation takes place sooner with deep than with shallaw cavities. The reason of this is that the shadow of a coucavity is very different at great obliquities from the shadow of a convexity. The shadow never can emerge out of a cavity so as to darken the surface in which the cavity is made, whereas the shadow of a convexity soon extends beyoud the outline of its base, and finally throws a long stripe of darkness over the surface in which it rests. Hence it impossible to mistake a convexity for a concavity when its shadow extends beyond its base.

When the concavity upon a seal is a horse, or any other animal, it will often rise into a convexity *when seen through a single lens*, which does not invert it; but the illusion dissappears at great obliquites. In this case, the illusion is favored or produced by two causes; the first is, that the form of the horse or other animal in relief is the oue which the miud is most disposed to sieze, and the second is, that we use ouly one eye, with which we cannot measure depths as well as with two. The illusion, however, still takes place when we employ a lens three or more inches wide, so as to permit the use of both eyes, but it is less certain, as the binocular visiou enables us in some degree to keep in check the other causes of illusion.

The influence of these secoudary causes is strikingly displayed in the following experiment. In the armorial beariugs upon a seal, the shield is often more deeply cut than the surrounding parts. With binocular vision, the shallow parts rise into relief sooner than the shield, and continue so while the shield remains depressed; but if we shut oue eye the shield then rises into relief like the rest. Iu these experimeuts with a single lens a slight variatiou in the position of the seal, or a slight change in the intensity or direction of the illumination, or particular reflexions from the interior of the stone, if it is transparent, will favor or oppose the illusion. In viewing the shield at the deepest portion with a single lens, a slight rotatiou of the seal round the wrist, backwards and forwards, will remove the illusion, in consequence of the eye perceiving that the change in the perspective is different from what it ought to be.

In my *Letters on Natural Magic*, I have described several cases of the conversion of form in which inverted vision is not employed. Hollows in mother-of-pearl and other semi-transparent bodies often rise in relief, in cousequence of a quantity of light, occasioned by refraction, appearing on the side next the light, where there should have been a shadow in the case of a depression. Similar illusions take place in certain pieces of polished wood, calcedony, mother-of-pearl, and other shells, where the surface is perfectly plane. This arises from there being at that place a knot, or growth, or nodule, differing in transparency from the surrounding mass. The thin edge of the kuot, &c., opposite the candle, is illuminated by refracted light, so that it takes the appearance of a coucavity. From the same cause arises the appearance of dimples in certain plates of calcedony, which have received the name of *hammered calcedony*, or *agate*, from their having the look of beiug dimpled with a hammer. The surface on which these cavities are seen contains sections of small spherical formations of siliceous matter, which exhibit the same illusion as the eavities in wood. Mother-of-pearl presents similar phenomena, and so common are they in this substance that it is difficult to fiud a mother-of-pearl button or counter which seems to have its surface flat, although it is perfectly so when examined by the touch. Owing to the different refractions of the incident light by the differeut growths of the shell, cut in differeut directions by the artificial surface, like the annual growth of wood in a dressed plank, the surface of the mineral has necessarily an inequal and undulating appearance.

In viewing good photographic or well-painted miniatnre portraits in an erect and inverted position, and with or without a lens, considerable changes take place in the apparent relief. Uuder ordinary vision there is a certain amonnt of relief depeuding upon the excellence of the pictnre. If we invert the picture, by turning it upside down, the relief is perceptibly increased. If we view it when erect, with a lens of about an inch in focal length, the relief is still greater; but if we view it when inverted with the same leus the relief is very considerably diminished.

A very remarkable illusion, affecting the apparent position of the drawings of geometrical solids, was first observed by the late Professor Neckar, of Geneva, who communicated it to me personally in 1832.* "The rhomboid A X," (Fig. 51), he says,

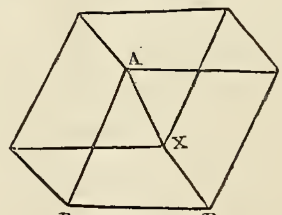

Fig. 51.

"is drawn so that the solid angle A should be seen nearest to the spectator, and the solid angle X the farthest from him, and that the face A C B D should be the foremost, while the face X D C is behind. But in looking repeatedly at the same fignre, yon will perceive that at times the apparent position of the rhomboid is so changed that the solid angle X will appear the nearest, and the solid angle A the farthest, and that the face A C D B will recede behind the face X D C, which will come forward,—which effect gives to the whole solid a quite contrary apparent incliuation." Professor Neckar observed this change "as well with one as with both eyes," and he considered it as owing "to an involuntary change in the adjustment of the eye for obtaining distinct vision. And that whenever the point of distinct vision on the retina was directed to the angle A for iustance, this angle, seen more distinctly than the other, was naturally supposed to be nearer aud foremost, while the other angles, seen indistinctly, were supposed to be farther away and behind. The reverse took place when the point of distinct vision was bronght to bear upon the angle X. What I have said of the solid angles (A and X) is equally true of the edges, those edges upon which the axis of the eye, or the ceutral hole of the retina, are directed, will always appear forward; so that uow it seems to me certain that this little, at first so puzzling, phenomenon depends upon the law of distinet vision."

* See *Edinburgh Philosophical Journal*, November 1832, vol. i. p. 334.

In consequence of completely misunderstanding Mr. Neckar's explanation of this illusion, Mr. Wheatstone has pronounced it to be erroneous, but there can be no doubt of its correctness; and there are various experiments by which the principle may be illustrated. By hiding with the finger *one* of the solid angles, or making it indistinct, by a piece of dimmed glass, or throwing a slight shadow over it, the *other* will appear foremost till the obscuring cause is removed. The experiment may be still more satisfactorily made by holding above the rhomboid a piece of finely-ground glass, the ground side being farthest from the eye, and bringing one edge of it gradually down till it touches the point A, the other edge being kept at a distance from the paper. In this way all the lines diverging from A will become dimmer as they recede from A, and consequently A will appear the most forward point. A similar result will be obtained by putting a black spot upon A, which will have the effect of drawing our attention to A rather than to X.

From these experiments and observations, it will be seen that the conversion of form, excepting in the normal case, depends upon various causes, which are influential only under particular conditions, such as the depth of the hollow or the height of the relief, the distance of the object, the sharpness of vision, the use of one or both eyes, the inversion of the shadow, the nature of the object, and the means used by the mind itself to produce the illusion. In the normal case, where the cavity or convexity is shadowless, and upon an extended surface, and where an inverted vision is used, the conversion depends solely on the illusion, which it is impossible to resist, that the side of the cavity or elevation next the eye is actually farthest from it, an illusion not produced by inversion, but by a false judgment respecting the position of the surface in which the cavity is made, or upon which it rests.

CHAPTER XVII.

ON CERTAIN DIFFICULTIES EXPERIENCED IN THE USE OF THE STEREOSCOPE.

There are many persons who experience great difficulty in uniting the two pictures in the stereoscope, and consequently in seeing the relief produced by their union. If the eyes are not equal in focal length, that is, in the distance at which they see objects most distinctly; or if, from some defect in structure, they are not equally good, they will still see the stereoscopic relief, though the picture will be less vivid and distinct than if the eyes were in every respect equal and good. There are many persons, however, whose eyes are equal and perfect, but who are not able to unite the pictures in the stereoscope. This is the more remarkable, as children of four or five years of age see the stereoscopic effect when the eye-tubes are accommodated to the distance between their eyes. The difficulty experienced in uniting the binocular pictures is sometimes only temporary. On first looking into the instrument, *two* pictures are seen in place of *one;* but by a little perseverance, and by drawing the eyes away from the eye-tubes, and still looking through them, the object is seen single and in perfect relief. After having ceased to use the instrument for some time, the difficulty of uniting the pictures recurs, but, generally speaking it will gradually disappear.

In those cases where it cannot be overcome by repeated trials, it must arise either from the distance between the lenses being greater or less than the distance between the eyes, or from some peculiarity in the power of converging the optical axes, which it is not easy to explain.

If the distance between the pupils of the two eyes, E, E′, Fig. 52, which has been already explained in Fig. 18, is *less* than the distance between the semi-lenses L, L′, then, instead of looking through the middle portions *n o*, *n′ o′*, of the lenses, the observer will look through portions between *o* and L, and *o′* and L′, which have a *greater* power of refracting or displacing the pictures than the portions *n o*, *n′ o′*, and therefore the pictures will be *too much* displaced, and will have so far *overpassed* one another that the observer is not able to *bring them back* to their place of union, halfway between the two pictures in the slide.

If, on the other hand, the distance between the pupils of the observer's eyes is *greater* than the distance between the semi-lenses L, L′, then, instead of looking through the portions *n o*, *n′ o′*, and therefore the picture will be so *little* displaced as not to reach their place of union, and will stand at such a distance that the observer is not able to *bring them up* to their proper place, half-way between the two pictures in the slide.

Now in both these cases of *over* and *under displacement*, many persons have such a power over their optical axes, that by converging them to a point *nearer* than the picture, they would, in the first case, *bring them back* to their place of union, and by converging them to a point *more remote* than the picture, would, in the second case, *bring them up* to their place of union; but others are very defective in this power of converging them beyond the pictures, and others between the pictures and the eye. This last, however, namely, that of nearing convergence, is by far the most common, especially among men; but it is of no

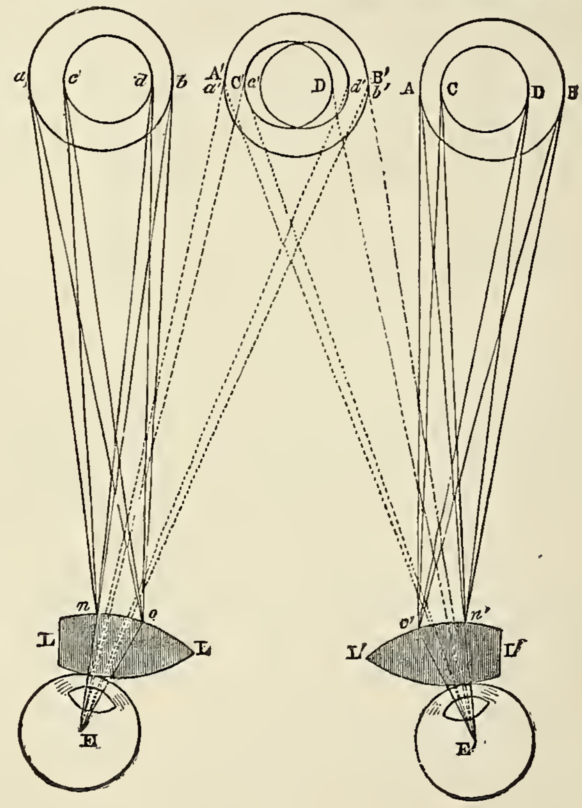

Fig. 52.

avail, and the exercise of it is injurious when the under refracted pictures have not come up to their place of union. The power of remote convergence, which is very rare, and which would assist in bring back the over refracted pictures to their place of union, is of no avail, and the exercise of it is injurious when the pictures have been too much displaced, and made to pass beyond their place of union.

When the stereoscope is perfectly adapted to the eyes of the observer, and the *general* union of the pictures effected, the remote parts of the picture, that is, the objects seen in the distance, may be under refracted, while those in the foreground are over refracted, so that while eyes which have the power of convergence beyond the picture, unite the more distant objects which are under refracted, they experience much difficulty in uniting those in the foreground which are over refracted. In like manner, eyes which have the power of near convergence will readily unite objects in the foreground which are over refracted, while they experience much difficulty in uniting objects in the distance which are under refracted. If the requisite power over the optical axes is not acquired by experience and perseverance, when the stereo-

scope is suited to the eyes of the observer, the only suggestion which we can make is to open the eyes wide, and expand the eyebrows, which we do in staring at an object, or in looking at a distant one, when we wish to converge the axes, as in Fig. 22, to a point *beyond* the pictures, and to contract the eyes and the eyebrows, which we do in too much light, in looking at a *near* object, when we wish to converge the optic axes, as in Fig. 21, to a point *between* the pictures and the eye.

When the binocular pictures are taken at too great an angle, so as to produce a startling amount of relief, the distance between similar points in each picture, both in the distance and in the foreground, is much greater than it ought to be, and hence the difficulty of uniting the pictures is greatly increased, so that persons who would have experienced no difficulty in uniting them, had they been taken at the proper angle, will fail altogether in bringing them into stereoscopic relief.

In these observations, it is understood that the observer obtains distinct vision of the pictures in the stereoscope, either by the adjustment of the moveable eye-tubes, if they are moveable, as they ought to be, or by the aid of convex or concave glasses for both eyes, either in the form of spectacles, or separate lenses placed immediately above, or immediately below the semi-lens in the eye tubes. If the eyes have different focal lengths, which is not unfrequently the case, lenses differing in convexity or concavity should be employed to equalize them.

SUGGESTIONS OF SUBJECT TO THE STUDENT IN ART.*

BY AN OLD TRAVELLER.

CHAPTER X.

Old English Towns and their Market-places—A Morn of May—"Doing observance" *more* Yarmouth—The First Merchant—A Customer—Io Penny!—A Wish and its frustration—Better Prospects—An Apology—The Privilege of Labor—Church and Trees—Charity—Prototype in the Biga of the Vatican—Chariot Races of Padua—A Charioteer—A Horse of "worthie race"—The Rows—Venice—Verona—The Lastrieata –Night in Verona—Home! still Home!—Burlington House in '55—Amateurs, Royal and Noble—Richard and Kate—Poets, Kings, and Commons of England—The Pride of Pembroke—A Hint from Mistress Gilpin—Fisherwomen of Norway—October departing—Consolations in November—Gaston Phœbus—Charles the Bad—The Banquet and its Events—A Great Misfortune—Messire Jehan Froissart—Raymond de Corasse—Messire Peter of Bearn—A Procession to Our Lady of the Woods—The Count's Hunting-party—The Vision—Forgiveness—Hunting at Home.

Not a few of our brave old English towns still make their best of a market-place; so fair and spacious in every extent, so grave and dignified, or so quaint and rich in pictorial effects, that no painter, worthy of the name, could be dropped into the midst of one without resolving to perpetuate its every characteristic feature on the choicest canvas of his studio—soon to become the best loved, also, as successful progress should bring the beauty and value of his work into greater prominence.

Such a picture, as the artist so determined will produce, was presented to our fortunate eyes no longer since than the summer just by-gone—alas! for the bright and fair departed! when the last delicious morn of May was exhibiting her wealth of loveliness—as who should say:—

"Let the June your hearts are turning to welcome, O ye fickle sons of men! bring you aught more lovely than these *my* charms, which you will presently be forgetting."

"Was then the fair month envious of her sister?"

Nay, boy! do her no such grievous wrong; some shade of sadness there might be passing over her pearly brow, but for so black a cloud as that within whose folds pale Envy shrouds her ugliness, far be this from the Queen of months. She did but heave one sigh for the loss of your love, ye poor children of mortality, and methought the softness of her beauty grew ever sweeter as she mourned for that best of treasures—affection: affection born of heaven, and heaven's fairest boon to earth.

May! but the last of May! And the hour? 'Tis that early one of morning, the first to follow the sunrise, when the beams exhibit that delicious palygold of their youth, unknown to such as keep closed eyes until their mid-day splendors blind the world. Over all the fair broad market-place are scattered numbers of small, slender, dim-colored fabrics, each much resembling a sentry-box; they are now lying, leaning, or standing about in rare confusion, but shall soon be all marshalled in trim array, such as Order prescribes in the mart when Traffic rules the hour.

As yet we have truce from the turmoil that shall prevail anon—the hour is yours, O Painter! One merchant alone is in the "receipt of custom," to apply for our own purposes a phrase due rather to him who gathers the fiscal tributes—one only, but a prosperous and well-appreciated chapman, as you see; since, of the few now but thinly peopling the ample space, a large proportion is either demanding, or in process of consuming, his wares.

"The cup
That cheers, but not inebriates,"

is that which you see dispensed, with appropriate edibles, by the "son of the morning," now adjusting his clean white apron (no true painter will start from the seeming bathos) for your especial benefit; and his consoling appliances are attracting within his orbit whatever can muster the respectable penny that shall pay for each steaming and well-odored libation.

Ah! good, honest, broad, helpful piece, with thy clear brown ample disk, its huge weight all unfelt by the hardy palm of him, but too well pleased to enfold thee in his grasp, the boy with blithe frank visage and firm determined step, that now approaches the tempting board:—not on reddest gold or fairest silver is the welcome face of our sweet liege lady so dear to the eyes of youth, in another class of her loving subjects, as it is on thy much begrimmed surface, stout, gladsome penny of my heart! Dear, and doubly dear art thou to the "thews and sinews" of the nation, as it makes its way to manhood, after the rough, yet not unhappy fashion familiar to the youth now resigning thee for a something, at this moment yet more precious and more needful—great as is the store he sets by thy comely self.

Now I would that at no point throughout the fair breadth of our lady's realm were there one child to be found who could not command thee, much-availing coin! but even as we utter the wish, come the longing eyes of yon poor pale mother, making sorrowful confession that no son of hers may this morning boast of possessing the potent wealth represented by thy good round bulk. Woe is me, penny! can there not be some means found for enriching the group around her to that extent?

There can, for the well-to-day laborer, sitting there swinging his substantial yet not unshapely legs from the rail that he has chosen for a seat, while he waits for his comrades, who will come to aid him uprear the tabernacles for the sellers, *he* has turned his glance in her direction. He looks careless and unmoved just at present, perhaps—yet never doubt him; the daughter of wretchedness comes nearer, and ever as she does so, that great brown hand of his gets closer to the pocket within whose depth thy beneficent presence hides unseen. A moment more, and the consciousness thereof shall gladden the poor, lost, ragged, lazy-looking creature, slowly coming within reach of him who toils, and who can therefore give; aye, even thee, O penny!

You will say she has the trailing gait of the practised beggar, and affirm that her indolence cannot fittingly be upheld by the labors of the industrious. Well, I grant you that there will be a misappropriation of funds—for the woman evidently *is* a beggar from habit, perhaps from choice; but look at her four wretched children! There is not much to reassure one as to her future in those faded looks, and it may not be denied that her dingy rags have an air of the parish workhouse; neither is that gait, inert and purposeless, without its significance. Still there are the children, and for this moment what can be done? they cannot wait for a breakfast until the mother has been rendered provident and industrious, wherefore let the rigor of your

* Continued from p. 336.

judgment be relaxed, and suffer industry to bestow on Idleness his hardly-won penny.

She has not yet detected the good provided for her by our friend on the rail; but wait a moment, and if it were not that we prefer to have her as she now stands, and must fix her so, and not otherwise, you should presently behold a spurious kind of energy informing those languid movements, and, the half-dead eyes would gleam, for at least some few short seconds, as her receptions became awakened to the fact of that large hand, stretching forth, as it surely will be, to endow her with the wealth you wot of.

A fine old church, shadowed beautifully, as we now see it, by trees—rarely found standing on similar sites—give peculiar character to our market-place; and this is further heightened by the dashing approach of a carriage, also peculiar to the place—Yarmouth, in Norfolk, namely—nay, which you will in no other. In form it is not unlike the Roman *biga*, as most of you have admired it in the rich white marble specimen giving its name to the "Hall of the Chariot," or "Salla della Biga," in the Vatican, where it forms the fairest ornament of that well-filled chamber of the gallery. Others of your number may have seen the same form of chariot, but in widely different material, as it whirls around the arena of Padua, and some few other Italian cities, where the chariot-race is still the rare exhibition of some extraordinary festival.

But to such as have not beheld that inspiriting sight, the Yarmouth carriage will give a most sufficing idea of the vehicle; while in picturesque effect the English charioteer is in no respect surpassed by his Italian compeer. Frank of aspect, bold and fearless of demeanor, and bearing a whip, which he holds chiefly as a staff of office, he stands, a hero accepting a triumph, rather than a hireling driving a fish-cart.

"Woe is me now for *that* bathos, for this time it seems real." Yet no! it is again but in seeming, friend Zoilus; do but look at the spirited air wherewith he stands erect as he now comes dashing towards us at the speed of his swift, yet powerful horse: no creeping, cart-like space is his—nay, the whole man is altogether different from those of his class elsewhere. Well set on his handsome shoulders, the head now has its crisp brown curls covered by a sturdy sou'wester; but how becoming is the confidence of its carriage, that head! and if he were to lift off the covering, what a good fair brow you should see! A short canvas frock next comes into view, with very loose trowsers of some nondescript material, with which you have the less to do, since they are almost wholly concealed by the classic form of the vehicle wherein he "comes spanking along." Spring aside, good friend, or he may chance to crush his critic, though to do evil be not in his habits. Mark him as he passes in full career, what a cherry-looking creature it is!—brown hues of health adorn his rough-hewn features,* a good-humored word seems all but visible on his lips, ready to greet you; and his expression is such that if you wanted help in a crowd, it is just to his very self that you would turn to ask it. And you would choose judiciously—earnest in his labor, ready for all things among his mates, dangerous, perchance, if wrongfully assailed and deeply moved, he is yet gentle as the gentlest woman if he finds you suffering; and that great rough hand shall lift the street-bred infant from its jeopardy with a tenderness of touch that only the mother's self could equal.

Then his horse—no unworthy portion of your group is he—strong, but not heavy; in the best of his age, and thoroughly up to his work, he puts the stones behind him at a pace such as no ordinary cart-horse "ever saw in a dream—he nor his fathers before him," as Eastern writers say. Is he not pleasant to look at—his small tapering ears pointing cheerfully forward, the bright clear eye, yet calm, and somewhat grave withal, bespeaking the excellence of his temper and the prosperity of his condition? How easy, and even pleasurable his task in this is he—"Warm and duly aired is my well-strawed stable, good and abundant is my hay, and my corn is of the best; pure is the water I drink, and never do the gross impurities I loathe come near the vessels of my service. Well fed and tended am I, and now will I do my work as a brave horse should." These are the thoughts you read in his comely looks, the good horse, and in excellent keeping they are with all else suggested by that group—man, horse, and classic-looking chariot. Let them only have, on your canvas, the life and movement they exhibit, and none shall say that this makes the worst portion of your picture.

Another peculiarity of the town in question is the frequency of those singular passages there called "Rows," of which there are many scores—nay, I think I have even heard that they amount to hundreds. They recall to the writer, as to others acquainted with the Lombardo-Venetian capital as well as the Norfolk seaport, certain remote parts of Venice, all unknown to the mere passing traveller; but still more closely does the "market Row" of Yarmouth—the best and handsomest of these passages—resemble that peculiar passage in Verona called the "Lastricata."

Leading from that great centre of gaiety for all who dwell in the city of the Montagues and the Capulets, the "Piazza Brà," this place is much frequented by the English and other travellers, who pass through it when returning thence to their hotels, or when proceeding to the amphitheatre, into which look the windows of the Lastricata on one of its sides.

But this assertion of resemblance must be taken with certain grains of allowance—more especially is there a difference in one respect, and that of no slight moment. Never in her wildest glee does Yarmouth pour through her decent thoroughfare so fearful a volume of sound as makes night hideous in Verona—yelling, howling, whistling, shrieking, roaring, bellowing, stamping, and tearing the affrighted air by whatsoever means their brazen lungs and ready limbs present—so does the crowd come rushing from the Piazza through that else fair paved-way called, because of that pavement, the "Lastricata."

And with this is the city afflicted at all hours of the night—nay, till deep in the morning: but less shall suffice you—listen to that unimaginable uproar but for one half hour, and the howlings of Pandemonium itself shall scarcely amaze you after that.

"We don't mean ever to make acquaintance with those howlings," some one is saying, in half-affronted tones.

So much the better, and your resolve is altogether praiseworthy; but then you must not venture within miles of Verona after nightfall, seeing that permission to roar their loudest is the sole form wherein a particle of liberty is accorded to the Veronese: and since they know it under no other, they make the most of their one privilege, to the sore discomfiture of the stranger—loving quietude—who dwells within their gates.

Your chief magistrate, Mayor, or whatever else may be his designation, would presently teach you better manners, O respectable Yarmouth, were you ever to forget yourself to such extent!—but you never will. You have voices, and know how to use them—aye, in mighty volume—what should ail you else? But you do not care to abuse the power, and that makes all the difference.

Yet—would you believe it?—when we have made our boast that neither by people nor rulers would these senseless outcries be tolerated in our own free townships, have not these benighted Veronese moaned in pity over our fettered state? They have—incredible as this may seem to you, ye men of Yarmouth; they are blind enough to view the matter thus, and that's a fact!

For those peculiar passages, the "Rows" then, are the picturesque English chariots you are here to paint constructed; they suit each other to perfection, and long may they sensibly continue to go on together prosperous and harmoniously as now.

Remaining still in the sweet motherland, nay, penetrating into those recesses of our domestic history as a nation, that no stranger, save as he be more than commonly privileged by that adoption of us and ours implied by love for what is best in us, may claim to follow, let us turn to one of the most touching epi-

* I am told that features very finely cut, yet always in manly mould, are by no means rare among this fine race of men, and there is no reason to doubt the truth of that assertion; but I write what I have seen, and as I saw it.

sodes in the home-annals of the bygone year. Calling memory to our aid, let us suppose ourselves to be once again proceeding through that heart-appealing gallery then established at Burlington House, that is to say, for the works of amateurs laboring in a most sacred cause,* and tell me whether any collection, though it were the most renowned and long-desired of all fair Art's wide-reaching domain, hath ever won from you so much respect as was accorded from your heart of hearts to that exhibition?

For ourselves, we can truly say that many a collection, to the sight of which we had long aspired, and had at length attained —perchance at no small sacrifice, and considerable, yet freely expended, cost, has failed to impress the writer as did that one; its contents offered from the hearts of our highest and noblest to alleviate the necessities of those who had laid the vast offering of their best and dearest on the altar of our common country.

Surely none could examine the closely crowded walls of those numerous chambers without the instant perception and ac knowledgment that in these were presented to him something altogether different from the ordinary assemblage of mere artistic efforts, always attractive, and often most admirable as these are. No place for the hard-eyed caviller was here, from the wearyful hyper-critic in Art we had for that time welcome truce; no cold and harshly judging glance was that bent by the deeply impressed visitor on those gifts of the heart, expanding their bright wealth before his moistened eyes; but on every face might be seen evidence of deeply-moved feeling, and the least impressionable felt himself, at least for that moment, a more sympathising, a gentler, and a better man.

Passing, on a certain occasion, through the rooms, and listening to the kindly remarks of some accomplished foreigners on the exhibition and its objects, the writer was frequently much interested, and always greatly amused by the various "compositions" grouped by them from the figures, and landscapes, or interiors, as the case might be, so richly abounding around us. With this employment they occupied themselves, as the result of a previous disquisition on that unhappy theme, the tendency of our professional artists to do their talents less than justice by the choice of a subject too frequently treated; this question then attracting much attention from the friendly critic and true lover of Art, as it has done in the season of the present year.

Here are some few of the groups or compositions thus formed —so far as memory has retained them. In the first we had the illustration of some well known stanzas from Bloomfield's "Richard and Kate:" bard, people, and painters, all specially English, seeing that the verses were those that follow, and the peasants were such as make the pride of our fair country, depicted by her Royal Highness the Dutchess of Gloucester, the Marchioness of Waterford, Lady Florence Legge, Lady Catherine Allen, and others, the noble maids and matrons of the land; while the site and structures were equally from English pencils—those, if my recollections serve me rightly, of Major Luard and Mr. Forbes Irvine. The stanzas chosen by our corteous "visitors from afar" were these:—

"Kate viewed her blooming daughters round,
And sons, who shook her withered hand:
Her features spoke what joy she found,
But utterance had made a stand.

"The father's unchecked feelings gave
A tenderness to all he said:—
'My boys, how proud am I to have
My name thus round the country spread!'

"'Through all my days I've labored hard,
And could of pains and crosses tell;
But this is labor's great reward—
To meet you thus, and see you well.'"

Incidents from the poems of Scott and Byron—authors ever highly appreciated by foreigners—were set before us in rich abundance, and with the most life-like effect, by aid of the northern scenery and people, or those of other countries, so abundantly furnished by the pictures before us. Around the Countess of Clarendon's "Cathedral Porch of Ulm" was grouped a melancholy assemblage, in illustration of an event which occurred at that unhappy period when the building, transferred from the Protestant inhabitants, was resigned to those of the Roman faith—but we will not sadden ourselves by the repetition of its details. The great deeds of our early kings, and the martial prowess of those who founded more than one of our proud baronial houses, with the sturdy uprightness of some who, originally belonging to a different degree, had eventually made themselves a name now pre-eminent among the highest, were in like manner pictured to the view—the works of Colonel Forbes giving good aid to the story of our Norman kings. Nor were the acts of noble daring that so finely illustrate the annals of our popular classes forgotten; the sea-pieces of the Countess of Uxbridge, Miss Campbell Robertson, and some others, gave birth to many a story of heroism displayed along our coasts: among the most striking of these was one suggested by that pride of the southern Cymry—the "Pembrokeshire Fisherwoman" of Lady Catherine Allen; they would lead us beyond the space permitted by my present limits, but are quite too good to be lost, and are but deferred to some more favorable moment.

Almost incredible instances of bravery, and of the still more beautiful fortitude of endurance, were described by an eye-witness of some among them, in relation to incidents connected with the late war; and of these, illustrations were gathered from various points, and most ingeniously arranged for their purpose by these flattering admirers of English "being and doing;" but I borrow a lesson of discretion from Mistress Gilpin, of undying memory, and withhold them—

——————"Lest all
Should say that she was proud—"

of the beloved country, that is; and your servant is all the more unwilling to incur such accusation from a kind of consciousness that it could not be successfully repelled; wherefore let us rather take a picture referring, not to ourselves, but to those of another land; yet one which the artist who loves the ocean or its bold and rocky coasts will do well to rescue from its present condition of non-existence, since it cannot fail, in his hands, to prove a highly efficient work. The subject is a custom, described to the knot of friends then holding colloquy, by one of their number, himself a native of the country where the poetic and touching rites in question are performed; it was suggested by one of the Norwegian fiords, before which the party stood as the speaker proceeded.

"In many of our fishing villages," commenced the animated narrator, "is still maintained the custom of sending forth the fishing barks, as they did of yore the ships of the sea-kings, to the music of a wild chant sung by our women, who assemble on the shore for that purpose, and mingle their voices in lays, which, despite their rudeness, have all the force and fervor of prayer."

"One of your own accomplished countrywomen," continued the speaker, "has rendered these harsh measures into song, that has but the one defect of too elegant a *tournure*—with this exception, the short specimen that will serve our purpose, and which is known to most of us, presents an exact copy of the original rhymes." The verses were then indicated to such as did not know them, and are those that follow; the grouping of the picture was next completed with great spirit from the figures around us—a process carried on much to the gratification of the parties engaged, but which I do not further particularize, leaving you to group your figures after your own liking. But be very certain that a charming picture will be the result, if you prove only half as successful as were the genial amateurs of another land, then rejoicing, like one of ourselves, in the beautiful, and more than beautiful, exhibition of character, no less than of ability, presented to their respect and admiration by the works around us.

* All will perceive that this can refer only to the works of amateurs exhibited "in aid of the fund for the relief of the widows and orphans of officers engaged in the war with Russia, opened by special permission of Her Majesty's Government at Burlington House."

The song chanted by these Norwegian sisters, wives, and mothers, I give below. They do not raise it until the last boat is fairly on its way, since it is rather a cry for the return of their beloved than supplication for success. Thus, your barks are all afloat, a scene of life and movement they make—but we remain with the wives and sisters; let us listen to their lay:—

"Come back! come quickly back!
Brother and sire come home!
Thus cry your loved ones on your track—
Husband, and lover, and son—'Come back!'
Over the surge and foam.

"Come back! come back! safe and loving us still, come back!
For our hearths are dark, and our souls are drear,
Till we see the light of your looks draw near.

"Husband, and lover, and son; brother and sire, come home!
The breeze has freshened, the sun gone down
Over the beaten foam.

"Sorrow and joy are ours, beyond what landsmen share;
Sorrow in every morn's farewell,
And joy beyond compare,
When at eve—all doubt and danger o'er—
Your boats bring all to the strand once more.

"Come back! come back! safe and loving us still come back!
For our hearts are dark and our souls are drear,
Till we see the light of your looks draw near."

Other pictures, illustrative of history, poetry, or manners, and chiefly, as has been said, from our own annals or domestic habits, were formed in that suggestive gallery, and in like manner, during the long and pleasant morning in question, but we have not place for more.

Some one says, "But you promised that we should remain at home awhile, and this Norway 'is not in the bond.'"

Well, and thrue for you your honner, Norway is not precisely at home, but neither is it so far off as to be altogether out of sight, in regard to the keeping of our agreeament—for, after all, the Norwegians are a kind of cousins to us; or, if you wont admit the kin, they have still a claim, seeing that by them and theirs it was that we were first flogged into shape for making a people. "Flogged," since no milder word can describe the process—scourged rather, and that with a whip of scorpions; but none the less put on the track to become a nation, since it was by them we were compelled to form a navy, as you cannot deny. Admit, then, that in sailing to Norway you are scarcely travelling "that far frae hame;" or, if your logical perceptions seek to convince you that herein is a mere fallacy, bid them carry their subtleties to some other market, and do you begin earnestly to paint me my pictures; not a stroke of your pencil but shall be worth a pocketful of syllogisms, and that you shall see.

Rich corronal of the year's best period, delicious October! Dear to the painter for the gorgeous lustre of her beauty—esteemed of the moralist for the steady rectitude of her character and the evenness of her temper—beloved above all by the traveller for that last quality, seeing that in no English month can he hope for equal consisteucy of purpose or propriety of deportment—and valued by each and all for many another virtue which need not now be enumerated, the dearly-prized October is preparing to leave us. Woe is me for the symptoms of that coming sorrow—they are not to be mistaken; already has the golden brown of her flowing mantle begun to exhibit the sere and paly yellow that betokens departure: pass some few short fleeting days, and the last of the year's fair daughters shall vanish from your eyes. O brethren of the pallet, even as we mourn, there come the sounds of her footstep, fast hurrying from the vapory breath of her dark kinsmen that are to follow, and leaving many a heart forlorn.

Yet not to all will this, the exodus of October, prove a cause of grief; there are to whom the advent of her grim successor will bring the best-loved of their pleasures. Yes, even among the sons of Art shall you find such, for not unknown to that bright band is the lover of the Chase; nor is he always with the herd who "tail off" before "the dogs run into him," as the men who call their scarlet "pink," are pleased to phrase it.

And they don't mean before the dogs "run into" the artist, as the "muffish" fashion of handling their jargon, proper to this poor scribe, would seem to imply: *a Dieu ne plaise!* they mean into the fox, poor fellow—but catch them giving him the good old ancient respectable name of his family! not they, the goosecaps! he is Charley, or he is Pug—yet wherefore Pug?—or, worst of all, he is "the villian," though why that last it might puzzle the wisest among them to tell; for if there be villainy in the case, it is rather in the two-legged assailant by whom poor Reineke is driven to his wiles, than in him who is but struggling for dear life. Or admitting that he does trim and take to crooked ways occasionally, is he the only trimmer? and is not any turn permitted if it save his sons from coming to grief for lack of his surveillance?

"His sons are old enough to take care of themselves, and his daughters are well established."

Let it be so, and I rejoice to hear they have been so fortunate, but,—

"But! He'll be taking care of your poultry-yards, if we don't take care of him."

"Ah thin! and small blame to him, if we lave the door open; 'tis necessary wolves should ate, lave alone foxes. But why would I be talking raison to a fox-hunter, when he'd rather be hearing what he calls music—maning, dogs that bark?"

"He might do worse," some one says. Well, he might! murder and arson to wit; or he might be given to the cold and cruel baseness of the turf and gaming-table—black as either fire raising or murder. So, if we can't give the best of our heart's cordiality to those who thus misappropriate too much of their time, yet, for the love of certain traits that embellish the character of the true sportsman, still more for that of some who love the hunting-field, if not "wisely," yet but only a very little "too well," do we at this season listen with patience, if not with warm sympathy, to the gladsome anticipations now succeeding, to talk of the moors, the patridges, *et id genus omne*. Nay, further, as eels get to love being flayed, so do we begin to find the theme not so much out of place when November—but for this resource a repellant member of the family of months—has brought his lowering face to the homestead.

For the sake of some among your painting fraternity, past and present, then,—their names will not be slow to present themselves,—let us turn to certain passages in the lives of mighty hunters—no lack of such in our frank land of sylvan as well as all other fame: yet, remembering that high authority who saith—

"Home-keeping youths have ever homely wits,"

suppose we first look elsewhere, and take pallet in hand for other times as well as other countries?

You have not now to learn how Gaston—third of that name—the viscount of Bearn and Count of Foix, was called Gaston Phæbus, chiefly because he *was* a mighty hunter, as it suits us to believe; certainly because he did without doubt rival Apollo in the beauty of his person if not in the use of the bow, and not, as learned folks, who love to spoil sport, will have it because he had chosen the sun for his device. The first two reasons are good enough for us, and shall suffice for our purpose.

You know, too, how unfortunate Gaston was in his connexion with that worthless Frenchman, Charles of Navarre, called deservedly Charles the Bad, whose sister he married, and who subsequently caused the son Gaston unwittingly to attempt his father's life. For the miscreant Charles persuades his sister that a certain powder which he brings her will secure the return of her husband's affection, falsely declared by him to be estranged from her. This then the countess encloses in a small purse, and suspends around the neck of her son, then on the point of returning to his father from the court of Charles, where she was herself residing—enjoining the youth to mingle the contents secretly with his father's wine, that so the love of the count might return to them both.

This moment in the life of the unhappy countess would scarcely

disappoint the hopes of him who should choose it for his subject, if treated ably; but we leave it, and pass to others.

The poison is discovered by Gaston Phæbus, who takes the purse from his son's neck as he sits at the banquet with his great vassals: and calling to him a dog, gives him a portion thereof, when the animal dies instantly, and the nature of the powder becomes apparent to all.

Placed in durance, the boy will not criminate his mother, and resolves to starve himself in the chamber that serves as his prison. He conceals his purpose so well, by casting his food from the window, and by the help of a dog, that he is all but dying when the adtendants discover it, and make the facts known to his father. Gaston at once repairs to the apartment of the captive, with severity in his aspect, but deep grief in his heart; the boy advances to throw himself at his father's feet—perhaps to confess the truth. But Gaston extends a hand to prevent him, and in his haste to examine the features of his child for that change which had alarmed the attendants, must needs have forgotten the small penknife which he was using when summoned by his servants, and which, in his agitation, he had neglected to lay from his hand.

Thus only can what then happened be accounted for, since all that is known of the matter goes to prove that in this act the point of the knife must have entered the throat of the boy. Yet so slight was the puncture, that at the time it passed unheeded—no one, perhaps not the young prisoner himself, was aware of the circumstance: and his father, after remonstrance and exhortation to better purposes, left the youth to his reflections. But not many hours had passed before Gaston Phœbus received the terrible intelligence that his son—the only one his wife had given him—was dying from loss of blood. Weakened by his previous abstinence, the slight incision, then only discovered, had sufficed to exhaust his remaining strength, and the boy was dead before his unhappy father again reached his prison. From the effects of this calamity Gaston Phœbus never entirely recovered.

These things are known to all, and few will have forgotten that among the learned men—very rare in that day—entertained by the Count de Foix at his court, was the chronicler, Messire Jehan Froissart, from whose enchanted pages it is that what you here find is gathered.

The name of Raymond de Corasse, another favored baron and frequent quest of Gaston Phœbus, will also be familiar to most readers; but what may possibly have escaped your notice, is the fact that this baron had a familiar Spirit, who, offended by some act of indiscretion on the part of De Corasse, forsook the castle of that feudatory for the neighboring woods, where the previously gentle and friendly sprite subsequently appeared in the form of a wild boar, exhibiting more than common ferocity. Now, in that day, none would presume to harbor the shadow of a doubt touching the personal identity of the spirit and the boar—neither are you permitted to do so in this present year of grace, though it do call itself eighteen hundred and fifty-six; seeing that for all the pictures you have already in thought commenced, or presently shall begin, as relating to these matters, you have the sanction of that "learned clerk," the delightful Messire Jehan aforesaid. His sanction for the fact that such things were *told*, that is to say—for his credence of all the marvels related, we do not vouch, nor does the question greatly concern us.

Thus, then, the story goes. Raymond de Corasse died, declining from the day of his familiar's departure, and expiring before the completion of the year: some time after, it chanced that the brother of Gaston Phœbus, Peter of Bearn,—whose ladiewife, the Countess Florence of Biscay, sister to Peter the Cruel, did herself relate the particulars to Froissart,—set forth to hunt this boar,* who had terrified his huntsmen by turning round upon them with fierce remonstrance, when too closely pressed by their dogs. But Peter de Bearn said, "Let the Boar talk at his pleasure; we are no babes to be baffled by words," and accordingly he was not to be entreated from hunting this boar as above said.

* Or, as elsewhere we have it, a wild sow.

Many hounds and not a few horses died in that encounter, but Messire Peter finally prevailed, he bore home the carcass of the bore in triumph; but every night thereafter was he found, by his terrified servants, uttering fearful cries, making a furious attack on the figures of the tapestry that adorned his chamber, and plunging the Bordeaux blade, wherewith he had finished the boar, into each and all, because persuaded that each in turn was the very boar in person.

This continued, and he could obtain no rest, until a certain monk from Pampeluna, well skilled in the exorcism of spirits, had performed many and potent ceremonies for his behoof.

Thus you may paint Messire Peter, if it so please you, as follows, for therein shall you not depart from historic truth. He has fasted through nine successive days, he and all in his castle, the learned monk not excepted. You now have him walking with his servitors in long procession, to the chapel of Our Lady in the Woods; on his person the proud knight bears no other garment than the short and scanty cassock of penitence, in common parlance called a shirt; barefoot, with uncovered head, and downcast features, he follows humbly after the monk of Pampeluna, a lighted taper now occupying the hand that most commonly bears more formidable weapons. The vassals of Messire Peter are also barefoot, but are else clothed in their ordinary garments, as being less guilty than their lord, by whom they had indeed been compelled reluctantly to enter on that forbidden chase.

All these things were recalled to the recollection of Gaston Phœbus by friends and servants, when his huntsmen reported that the same boar—again in life, notwithstanding the prowess and the penitence of his brother, Messire Peter—was then ravaging the woods of Sauve-Terre. Yet was he not to be deterred from attempting the chase, and on the following day he too went forth with that intent, accompanied by Froissart himself, and by many others, his kinsmen, guests, and nobles.

Five hours the chase proceeded happily; fresh horses were then mounted, and for three hours more the company kept well together. A new pack was then uncoupled, and with these, Gaston Phœbus, with Froissart and some others, continued the chase, but gradually the hunters fall off, Gaston alone cheers on the dogs, and of these few now remain. At length his four staunch bloodhounds, brought at his command by their trembling keepers, alone pursue the boar; twilight succeeds, and even they come trailing on exhausted, and uttering a melancholy howl. But the voice of their master arouses them, they resume the track until darkness shows them the eyes of the animal, ominously casting a lurid light on the else invisible path he pursues. Three of their number then refuse to follow, one dog only now accompanies Gaston Phœbus, and the boar has turned to face him. Boldly the faithful Brux springs onward, but at the moment when his jaws seem fastening on the bristling hide, the wild boar has vanished with an unearthly cry, and the count's horse sinks beneath him. Freeing himself swiftly from the fallen animal, Gaston Phœbus draws his hanger, and hurried to the point where he had beheld the red eyes of the boar flaming beneath a huge tree, unable to persuade himself that the disappearance he had witnessed could be real; but he finds nothing save his hound, whining mournfully and shaking with terror. Encouraging the faithful creature as he best might, Gaston Phœbus laid himself by his horse to take some rest; the trembling Brux crept close beside him. After a time the count rose to seek shelter, or perhaps only seemed to do so—for there are not wanting persons claiming to be wiser than their fellows, who affect to believe what follows a mere vision; for myself I incline to think—but no no matter, permit the chronicler to proceed.

The count rose from his seat, then, in the dark and silent forest, and after long wandering, perceived a castle, whose appearance was not familiar to him. This caused him no little surprise, since he was not so far from his own abode of Orthez but that every castle should have been well known to him. He wound a blast on his horn nevertheless, and the drawbridge being lowered, although no warder appeared, Count Gaston passed across. Yet it was long before he could embolden his

hound to follow his example, and not until he had been thrice summoned, did the usually obedient Brux cross the moat.

Astonished that no officers of the household appeared to receive him, no pages and no valets to give the due attendance, Gaston Phœbus was yet further amazed by the strange fact that his footstep awoke no echo, nor did sound of any kind meet his ear. One solitary lamp shone in the distance, and approaching this by a long corridor, Count Gaston perceived it to light a broad staircase, up which he took his way, and at the summit thereof beheld, stretching before him, the ample space of a banquetting hall, with the table spread, but no hospitable castellan to receive the guest.

Reluctantly the hound had followed, but he was there, and Gaston Phœbus was conscious to a sense of relief and comfort as Brux took a place at his feet, when he had assumed the chair of state prepared for his use. A silver whistle lay upon the table, and taking this, he blew the same to summon squire and page with water for his hands. Then the tapestry covering a door at the farther end of the apartment was lifted slow, and as it rose the hound set up a mournful howl. A figure was now seen to draw near through the dim obscurity of the chamber, but faintly lighted by a lamp suspended from the roof: yet was no sound of footstep audible, and the dog, desisting from his plaintive cry, began to tremble in every limb.

Slowly did that form approach the table, and a strange suspicion seized Count Gaston; a few more awful moments and that dread conjecture became conviction. The silent shape was too surely that of his buried child, and the heart of the brave man quailed before it, even though his conscience could not reproach him with wrong done. Gaston held forth his hands nevertheless; he stretched them over the basin presented for his use: that spectral form held the ewer aloft, and as the appearance of water fell on him, a sense as of heavenly blessedness, seemed to pervade his whole being: a something whispered, yet it was not the voice of his son, for the shadowy form uttered no sound; yet a perception was conveyed to him that the child had obtained permission from heaven to wash his innocently shed blood from the father's hand; the last sensation of Gaston, as he sank lifeless from his chair, was one of infinite consolation—his child had brought him forgiveness.

Many pictures and those of varied character, present their changeful hues as this page of old tradition unfolds its revelations; the different moments to be treated must be left to the choice of the artist.

But in all this there is little of hunting, as we have it practised in that genial home of the science, an English hunting field, will some one say; and there is no denying that a day with the Quorn, the Cottesmore, or the Pytchely, will have more charms for him whose enviable lot—as a hunting-man—is cast in those brilliant lines: nay, the doings of what your Leicestershire "Cut-me-downs" are pleased to call that "slow" shire, which takes pride in the Vine and the Tidworth, would be more germane to the matter, so far as hunting in England is concerned; but with what hope may the uninitiated venture to approach that theme? how attempt to fathom those mysteries, which, if you listen to hunting-men, would seem to render horsemanship and hunting more impenetrable, to all save themselves, than are the riddles of the Sphinx? No, the adventure is all too mighty, it demands more daring than has fallen to the lot of the present writer: your brethren, who mount the scarlet, are alone competent to depict the hunting-field, and to them we leave it.

Rouge.—Under this name the sesquioxide of iron is sold for polishing purposes to the daguerrean artist. It is prepared by precipitation, and calcination. The best jeweller's rouge is prepared by calcining the precipitated oxide until it becomes scarlet. The sesquioxide of iron, prepared by precipitation, is an impalpable powder, of a brownish red color. Rouge for daguerreotype purposes should be tasteless, and without a sense of grit when rubbed between the fingers or on the tongue.

LECTURES ON PHOTOGRAPHY,

Delivered in the Royal Institution of Great Britain.

BY THOMAS A. MALONE, F.C.S.,

Director of the Laboratory in the London institution.

§1.

In the months of April, May, and June of the present year, the writer had the honor of delivering, in the Royal Institution, a course of lectures on that universally interesting and useful branch of art-science of which this Journal is pre-eminently the exponent. It was thought that some account of the facts and observations then brought forward, might be acceptable to may of the various readers of the Society's Journal. Accordingly, at the request of our Editor and Secretary, I have ventured to promise to do my best to lay before the Members of the Society, and other readers, the essential points which formed the basis of my extemporaneous remarks.

Were it even possible, it would not be judicious to attempt anything like a *verbatim* report. I must therefore request the indulgence of the reader, and especially of those who were present, if I expand, or in some cases contract certain parts of my subject, especially were otherwise experimental demonstration would be required for an easy and full appreciation of the point discussed. I claim this liberty also in those parts which are chiefly historical, or which relate merely to theoretical matters still under consideration; promising in return, to give to *practical* matters all the completeness and precision which may prove to be compatible with that imperfect knowledge which, we still have to lament, exists, regarding many important particulars.

That photography is, as its name implies, the art of delineating, or depicting by means of light, none, it is presumed, now need to be told. It may, however, be more necessary to remind some that photography is no less a science than an art. As a science, it takes account of all the changes which occur more or less in all bodies in nature submitted to the influence of the sun, or other source of light; and this with a view to the discovery of the laws which regulate and limit all such changes.

The history of photography has yet to be written. Several authors, the chief of whom in the order of time are Mr. Robert Hunt and the Abbé Moigno, have collected materials, from which we gather that the chemical action of light, and its power of producing marked changes in bodies exposed to its influence, were observed at a comparative early period. Indeed, it is only natural to suppose that the fading of colored materials, stained with the rude pigments of the earliest civilized or uncivilized dyers and colorists, soon attracted attention. Hence we are not altogether surprised to find that nearly two thousand years ago, Vitruvius, the Roman architect, directed that apartments for the reception of pictures should be built facing the north, to escape the destructive action of the direct rays of an Italian sun.

Again, there can be little doubt that those alternately maligned and panegyrized pioneers of chemistry, the alchemists, knew that a certain compound of silver, *horn silver* (so termed from its translucency and behavior under the knife), blackened in the light;—though it is a curious fact that this chloride of silver or *luna cornua*, in its mineral form, has been kept openly in some of our museums without undergoing any apparent discoloration. The alchemists, as far as we are aware, made no practical use of these facts regarding light.

From the alchemists we come rapidly down near to our own time. In 1772, Petit, it is recorded, observed that a solution of a salt crystallized soonest upon the side of a vessel most exposed to the light. Similar phænomena may be daily observed among the apothecaries' and chemists' medicinal stores. Camphor collects in very pretty crystal-like forms upon the lightest side of the bottles or glasses in which it is kept. Iodine does the same. I have observed a case where the quantity thus deposited bore some relation to the light which fell upon it. A bottle of iodine, partially filled, stood near an open door; from an opposite direction and at a distance, a feeble light came horizontally,

and also fell upon the bottle; large and massive crystals gradually formed in the strongest light, while small, and seemingly ill defined particles were deposited in the feeble one. Changing the position of the bottle reversed the phænomena, which certainly deserve a closer investigation. The destruction of color by light may also be usefully observed in the case of colored powders, or leaves, roots, and barks stored up in bottles for medicinal purposes; the side next the light being generally paler and inferior in color to the shaded parts. What kind and amount of change or deterioration has gone on should be ascertained. That injury is apprehended may be inferred from the fact, that dark-colored bottles are made and sometimes used with a view to exclude the *light*; but that the nature of the change is ill understood is evident from the fact, that the colors selected for the bottles are not uniform, dark green or dark blue and purple being indiscriminately used.

We shall presently see that the choice of a color is not immaterial, since the blue and violet rays of light are found to possess a destructive power quite disproportioned to their luminousness, and a power not possessed equally by all the rays, the green being far less energetic. Let me give a case in point. I some time since purchased of a generally well informed druggist, some nitrate of silver, observing at the time that the bottle in which it was kept was of a blue color. I asked his reason. As I had anticipated, it was kept in a *dark* blue bottle to preserve it from the *light*. Now, here it was easy for a photographer to detect the fallacy of this reasoning; for if nitrate of silver be in a condition to change at all, we know that the blue rays, dark as they are, are just those which will soonest effect its destruction. I fear, and as an old *pharmaceutist* I do not hesitate te say, that more important matters than nitrate of silver are thus mistakenly *scientifically* (!) treated.

In 1777 Scheele writes,—"It is well known that the solution of silver in acid of nitre poured on a piece of chalk, and exposed to the beams of the sun, grows black; the light of the sun, reflected from a white wall has the same effect, but more slowly; heat without light has no effect on this mixture." He adds, what is still more important,—" Fix a glass prism at the window, and let the refracted sunbeams fall on the floor, in this colored light put a paper strewed with *luna cornua*, and you will observe that this horn-silver grows sooner black in the violet ray than of the other rays*

Senebier confirmed Scheele's account, and added that he found chloride of silver which darkened to a certain shade in the violet ray in fifteen seconds, required the action of the red ray for twenty minutes.

Senebier also experimented on the influence of light in bleaching wax; an interesting subject, for to this day the best wax is still bleached by sunlight, or prolonged exposure to the diffuse light of day.

In 1798, Count Rumford, in the ' Philosophical Transactions,' in " An Inquiry concerning the Chemical Properties that have been attributed to Light," controverts the views of previous observers, and endeavors to prove " that all the effects produced upon metallic solutions by bright sunshine, can be obtained by a prolonged exposure to a temperature of 210° Fahr. ' This attempt at " hasty generalization" by so eminent a man as Count Rumford, would be well remembered as a lesson for in 1802, Mr. Harrup, in a communication to 'Nickolson's Journal,' refuted the Count by showing that several salts of mercury were reduced by light alone, and not by the well known rays of heat. Rumford's love for his favorite subject probably made him in this case a prejudiced, and therefore a short sighted observer; for though in some cases heat and light are equivalent, as to the ultimate effect, we have unquestionably proof of the existence of distinct and important powers of varieties of one power, emanating from the sun, and travelling, as we say, along the same path, with the heat and light-giving rays or *impulses*.

In 1801, Ritter proved that there were rays existing beyond the visible part of the spectrum, which had the property of blackening chloride of silver. The subject of the various actions of light was now further investigated by Bernard, Seebeck, Berthollet and others on the Continent, and by Sir William Herschel, Sir Henry Englefield, Dr. Wollaston, and Sir Humphrey Davy in this country; but here for a time, we must be content to rest.

And now, having made ourselves sufficiently acquainted, for the present, with those discoveries of early observers which bear upon practical photography, we shall next examine the early labors of the first practical photographers, Thomas Wedgwood, Davy, Niépce, Talbot, and Daguerre.

I must here beg to acknowledge my obligations to the works of Mr. Hunt, and to the Abbé Moigno, ' Repertoire d'Optique Moderne;' and to refer my readers to them for the fuller treatment of the historical matters contained in this sketch. I must also express hope that I may be allowed to request, that those who happen to possess any special information regarding the early history of photography, will be kind enough to furnished it. It shall be carefully examined, and duly acknowledged.

(*To be continued.*)

* The blackening of chloride of silver, and the action of the blue and violet parts of the prismatic spectrum on a silver compound, were well shown by the aid of M. Duboscq Soleil's electric lamp, supplied with forty cells of Grove's battery.

NOTE ON PRESERVATIVE PROCESSES.

BY MR. HARDWHICH.

Sir,—The letter which I addressed to Mr. Llewelyn on the honey-preservative process, through the medium of your columns, was intended simply to elicit further information; my experience not having been sufficiently great to justify me in assuming any other position than that of an inquirer.

The difficulties I at first encountered were in obtaining a rapid action in the camera and in bringing up the intensity of the negative; but on repeating the trial, with the same oxymel, only a few days since, I found that the latter inconvenience had disappeared, and that sufficient blackness was attainable with two applications of the developer. The weather is now cooler than it was, my nitrate bath is older, and gives greater intensity, and, in accordance with suggestions received from Mr. Llewelyn, I have shortened the time of washing the plates, both before and subsequent to the application of the syrup; but to which of these alterations the improvement is to be attributed, I am unable to say.

The want of sensitiveness in the preserved plates I still have to complain of; and as omission of the acetic acid does not appear to be a full remedy, I cannot but suppose that the quality of the honey is in fault. Will the foreign honey, as sold in the shops, and which is sometimes fluid, and sometimes solid, answer the purpose? A correspondent of mine, whose opinion is valuable, thinks that almost any honey may be made to succeed, but that if much *wax* is present the sensibilty of the plates will be injured. Others, however, have stated differently, and hence it will be useful to collect more facts bearing on the subject.

With reference to the question of how much of the free nitrate of silver should be allowed to remain upon the film, I may mention, that it was more to facilitate the development of the image than to increase the sensibility of the film, that I adopted the plan of only partially washing the plates before applying the syrup. Hence, when sufficient intensity can be obtained, a full and complete washing will perhaps be the best. Mr. Llewelyn, who has tried the process in which nitrate is left, speaks of it as *uncertain*; and when we consider that honey exercises a reducing action upon the salts of silver, it seems likely, on theoretical grounds, that it would be so; that the action would be liable at times to go beyond the proper point, and so occasion a result different from what is usual.

That the oxymel process, although excellent for its simplicity, will ever be found to equal Dr. Taupenot's in rapidity of action, I much question. The sensitiveness of the collodion albumen is probably understated in the instance quoted by Mr. Llewelyn, and it appears to me, that for a landscape view in the sunshine

MARKET PLACE, NASHVILLE, TENN.

Negative by Dodge & Wenderoth.

of a summer's day, *four minutes'* exposure would be nearer the mark than eight minutes.

Meeting with a favorable opportunity some short time back, I put the relative sensibility of the two processes to the test, and found that of Taupenot to be less than newly-mixed collodion by about four times; whilst the plates preserved by oxymel as I use it, required at least eight times, perhaps ten times, the ordinary exposure. The object selected on which to try the plate, was an old shed surrounded by trees, with a long retreating shadow underneath it, sinking gradually into perfect darkness. The exposure in the camera was timed with reference to the darker parts of the object, and that process was considered the best which followed back the shadow to the very end, without reddening the sky or making the lights impenetrably black and opaque upon the negative.

Judging from the results obtained in this way, I may venture to predict, that the ensuing exhibition of the Society will contain pictures by the collodio-albumen, and also by the honey-preservative process, fully equal to the average of those on moist collodion, and superior to anything which could be taken with collodion such as is often used.

The employment of albumen in Taupenot's process seems to assist in giving to the negatives that brownish-black translucency, which offers the greatest resistance to the passage of actinic rays; but, from my own limited experience, I should be inclined to suppose that amateurs at their first trial would probably find a difficulty in overcoming *blistering* of the film; and also in fermenting the albumen, a process which does not appear to be essential, and which has been discarded by many successful operators. If, however, the advocates of the fermentation can show that it makes the albumen less contractile, and lessens the chance of blisters, by all means let it be adopted.

Yours, Sir, most obediently,

F. Hardwhich.

From La Lumiere.

DIFFERENCE IN ACTION

Of Light and Heat on the Chlorides and Iodides of Silver.

From the French of MM. ZANTEDESCHI AND BORLINETTO, by W. GRIGG, ESQ.

In the *Comptes Rendus* of the Academy of Sciences of Vienua, we find a second memoir of Photography, containing some very remarkable experiments by MM. Zautedeschi and Borlinetto of the University of Padua. We hasten to give our readers a summary of these experiments which relate to the action of light and heat on the chlorides and iodides of silver, more especially as we have in previous numbers published the experiments contained in the first memoir.

I. *Experiments on Chloride of Silver.*

It is well known that chloride of silver blackens under the influence of light; at first it assumes a violet tint, passing necessarily through various shades, which are sometimes very difficult to determine.

Subsequent to 1854, Mr. Borlinetto had described the following tints observed in the coloration of chloride of silver—gray, blue, blueish violet, blue black, black, lighter blackish color, the same with a yellow tint, dry leaf yellow, and greenish grey, which becomes clear under the action of light.

For these variations of tint the authors think, with reason, that the mode of preparing the chloride of silver is of great importance concurrently with the intensity and the duration of the action of light. In the same, chloride of silver exposed to the action of heat in the dark at a temperature of from 6° to that of boiling water, mercury and melting lead, the authors have not observed any change of color.

M. Niépce de Saint Victor, as is known, has stated that chloride of silver blackened by exposure to light, would become white in the dark under the influence of calorific rays. This experiment has been often repeated by authors without any noticeable result in relation to color, although the temperature was gradually carried up to that of melting lead. They only remarked a very slight alteration in the tint of the chloride, but in no case did it reach a white. The chloride of silver employed was obtained by the action of acetate of silver on chloride of sodium, and the precipitate had been washed eight times.

II. *Experiments on Iodide of Silver.*

Iodide of Silver may be obtained in different ways, but we have drawn it from the following compounds:—iodhydrate of ammonia, iodide of zinc, iodide of potassium, iodide of cadmium. The following are the manipulations in detail which are of great importance to photography.

1st, On the 3d November, 1855, the authors precipitated a solution of iodhydrate of ammonia by acetate of silver, washed the precipitate four times with distilled water, and divided it into two parts, one of which they exposed to the action of diffused light under a clouded sky. The exposure was continued fifteen minutes, the precaution being taken to keep the iodide of silver in continual motion by means of a glass rod, in order to change the surfaces and present the entire mass to the action of the light. Temperature $16\frac{1}{4}°$; time, from noon to 1 o'clock afternoon.

The other part of the iodide of silver exposed to the action of heat in the dark, at a temperature, at first, of lead fusion, and subsequently down to that of the atmosphere, did not change color; that is to say, preserved its characteristic yellow. The first part exposed to the action of light, was then submitted to the action of heat as in the preceding case, commencing at the lead fusing temperature. In this case an augmentation in intensity was observed, and the tint became more obscure.

2nd, The authors proceeded in an analogous manner with the iodides of silver, obtained from the iodides of zinc, cadmium and potassium.

December 21st, the sky being clear and the temperature being 15°, the iodides of silver obtained from the iodides of zinc and potassium, after an exposition of fifteen minutes to the direct action of the sun, showed a slight change of tint but no change of color. On the other hand, iodide of silver obtained from iodide of cadmium, under the direct influence of direct light, darkened almost instantaneously, in from three to four seconds. The phenomena which these iodides present under the action of heat, is worthy of remark and the entire attention of photographers. Whilst the two first remain unchanged, the third, on the contrary,—that is to say, that obtained from the iodide of cadmium,—assumes a black tint in the dark by the simple action of heat. The three iodides had been prepared the day previous, and were still moist in the filters in which they had been kept. The authors intend to repeat this experiment with iodides freshly prepared. It is incontestable that the iodides of silver prepared by different processes, possess a different photographic sensitiveness. This fact is of vast import for the photographic art, and the authors have concluded from repeated experiments, that the iodides of silver obtained from the iodide of cadmium and zinc, are the most sensitive.

A very ingenious idea promulgated by the authors, and supported by one of their experiments, was to see whether the phenomenon observed in the dark and by the simple action of heat on iodide of silver, obtained from iodide of cadmium, would furnish a purely calorific process. In this case, the new art should be denominated *Thermography*, and no longer photography.

In the course of their experiments, the authors remarked that the iodide of silver obtained from the iodhydrate of ammonia, precipitates very rapidly, and that obtained from iodide of cadmium very slowly. The time employed, also, in filtering is not the same for the four iodides. The washing of iodide of silver, obtained from iodhydrate of ammonia is easy; then comes that obtained from iodide of cadmium, and lastly that from iodide of potassium. The filters used by the authors, were the manufacture of MM. Prat, Dumas & Co., of Lyons.

3d. December 5th.—The authors prepared the different iodides of silver by precipitating with an excess of acetate of silver. In this particular, they observed that all the four iodides

were colored by the direct action of solar light. The iodide of silver, however, obtained from iodide of cadmium, manifested the same sensitiveness as in the preceding experiments, and the other iodides all colored in the space of about four minutes by the action of the light, and at a temperature of 15°. The four iodides then exposed to the action of the heat from fused lead, were longer in coloring than under the direct action of the sun. The iodide of silver obtained from iodide of cadmium, assumed a red wine color. The tint of the other three iodides was a deep green. The fact observed by the authors, that is to say, that the color of the iodide of silver obtained from iodide of cadmium, is the same, whether by the action of light or the influence of heat, is worthy of the attention of chemists and philosophers, and of all who are directly occupied with photography. As to the color of the three other iodides, they present the same pheuomena. The authors insist on these facts and their experiments which demonstrate matters, which until now have not been studied, and which may furnish very important data for the photographic art.

It must not be forgotten that the iodide of silver exposed to light merely darkens on the surface, and that the same exposed to the action of heat, becomes discolored throughout its entire mass.

4th. December 6, 1855.—The authors compared the relative sensitiveness of the four iodides to the action of solar light. The experiments were made from 10 A. M. till noon, at a temperature of 16¼°—they were made with collodion in the photographic mode. It was observed that the iodide of silver obtained from iodide of potassium was the most sensitive, whether evincing this in the intensity of the tint obtained, or the time employed. The authors also obtained some beautiful instantaneous proofs of a carriage in motion, and of a cart drawn by oxen. The collodion employed was thus composed:—

Chemical Collodion	16	grammes.
Sulphuric Ether	8	"
Alcohol at 36°	8	"
Saturated Alcoholic Solution of Iodide of Potassium	2	"

The authors also made experiments with collodion prepared by the formulas of MM. Le Gray, Van Monckhoven and Belloc, which we shall hereafter analyse.

III. *Experiments on Iodide of Silver obtained from Iodide of Potassium, without Collodion.*

The following are experiments made December 7th, 1855. Temperature 15°, sky clear.

1st. Iodide of silver obtained from iodide of potassium in excess, being exposed 15 minutes to light, takes a very light tint. The same iodide under the action of heat (62° 5′ and under) does not change color.

2d. Iodide of silver obtained from the iodides of potassium, with an excess of acetate of silver, discolors instantaneously, and in one hour becomes black. The same iodide under the influence of heat (62° 5′ to +25°) discolors at once, and, after all the water it contains has evaporated, becomes completely black.

3d. Iodide of silver obtained from iodide of potassium in equal quality, discolors immediately under the action of the solar rays, and after an expiration of fifteen minutes, the tint becomes deep green. The same iodide by the action of heat (62° 5′ to +25°) undergoes slight coloration.

These facts explain the phenomenon observed by all photographers, namely, that in winter at low temperatures, the reducing chemical action is slower than during the summer at a high temperature.

IV. *Experiments on Iodide of Silver obtained from Iodide of Potassium with Collodion.*

December 8th, 1855—sky clear—temperature 17°.—From noon till two o'clock, P. M., the three following experiments were made:

1st. With iodide of silver obtained with excess of nitrate of silver, the authors obtained a fine negative in twenty-five seconds.

2d. By iodide of silver obtained with an excess of iodide of potassium, the negative was very imperfect.

3d. Lastly, with iodide of silver obtained without excess of acetate of silver and iodide of potassium, the picture developed very slowly, even by the aid of pyrogallic acid.

These experiments demonstrate that iodide of silver, obtained with an excess of acetate of silver is the most sensitive and most suitable for photographic purposes.

V. *Experiments on Iodide of Silver obtained from Iodide of Cadmium, without Collodion.*

The authors, before proceeding to comparative experiment, made some investigations relative to the sensitiveness of collodion prepared according to Monckhoven's formula; but with the proportions indicated by that distinguished photographer, they obtained no satisfactory results. For this reason they were obliged to seek other proportions, and after many unfruitful experiments, they succeeded in preparing a collodion of extreme sensitiveness, and, so to speak, instantaneous. The following is the authors' formula:

Chemical Collodion	900	parts.
Sulphuric Ether	480	"
Alcohol 36°	480	"
Iodide of Cadmium, 2 per cent.		

This collodion, thus prepared, is very limpid, transparent, and perfectly colorless.

The following are the experiments mentioned by the authors:—

1st, Iodide of silver obtained from iodide of cadmium, with an excess of acetate of silver, dissolves at once under the action of direct light, at a temperature of 15°, and after an exposure of five seconds becomes dark green. The same iodide by the action of heat (+62°.5), assumed a dark tint, and after the evaporation of its water, became deep green.

2nd, Iodide of silver obtained by an excess of iodide of cadmium, changes not under the action of direct light and fifteen minutes exposure; neither does heat (62°.5) affect any change in the color of this iodide.

3d, Iodide of silver obtained by equivalent proportions of acetate of silver and iodide of cadmium, discolors slowly under the action of light, the final tint being a deep green. With heat, the same iodide assumes a deep yellow.

These facts show clearly that the ordinary temperature of the atmosphere may reduce the iodides with the concurrence of light, and that in summer, it is best to work at a temperature not exceeding 25°, the iodides being kept moist, or better still, in their mother water.

VI. *Experiments on Iodide of Silver obtained from Iodide of Cadmium, with Collodion.*

The following results were obtained December 9th, 1855, from nine to eleven A.M., temperature about 14°, atmosphere bright and clear:—

1st, Iodide of silver obtained with an excess of acetate of silver, gave a beautiful negative in five seconds, with a Waibl object glass, with a diaphragm of about ⅘ of an inch diameter.

2nd, Iodide of silver obtained with an excess of iodide of cadmium, under the same condition, with an exposure of five seconds, produced no visible result.

3d, Lastly, iodide of silver obtained by equivalent proportions of iodide of cadmium and acetate of silver, gave but an imperfect proof in five seconds.

VII. *Experiments on Iodide of Silver obtained from Iodide of Zinc, without Collodion.*

These experiments were made December 12, 1855; time from ten o'clock A.M. till noon; the weather fine and the thermometer indicating 15°, as follows:—

1st, Iodide of silver obtained with an excess of acetate of

silver, discolored immediately under the action of solar light, but the deep green tint showed itself after fifteen minutes' exposure. The coloration took place also under the influence of heat (from +62°.5 to +25°).

2nd, Iodide of silver obtained with an excess of iodide of zinc, did not change, neither under the action of light, nor the influence of heat.

3rd, Iodide of silver prepared with equivalent proportions of iodide of zinc and acetate of silver, discolors under the action of light, also under the influence of heat. The authors have, besides, verified that iodide of zinc prepared from commercial zinc, does not give a very sensitive iodide of silver. Iodide of zinc, on the contrary, prepared from distilled zinc, gives a highly sensitive iodide of silver, comparable to iodide of silver obtained from the iodides of cadmium and potassium.

VIII. *Experiments on Iodide of Silver obtained from Iodide of Zinc with Collodion.*

December 13th, same year, temperature 30°, with the following results:

1st, Iodide of silver obtained with an excess of acetate of silver, gave no proof after an exposure of five seconds, even by the action of pyrogallic acid. After twenty seconds exposure, the image was no clearer. A diaphragm of $\frac{2}{5}$ of an inch diameter was used. Without this diaphragm, a fine negative was obtained in the camera in forty seconds, by the aid of pyrogallic acid.

2nd, Iodide of silver obtained with an excess of iodide of zinc, after an exposure of forty seconds without the diaphragm, gave a pure and well defined negative.

3d, Iodide of silver obtained by equivalent qualities of nitrate of silver and iodide of zinc, by an exposure of forty seconds and the action of pyrogallic acid, gave a very imperfect negative.

IX. *Experiments on Iodide of Silver obtained from Iodhydrate of Ammonia without Collodion.*

The following experiments were made December 18, 1855; time, from 10 A.M. to 1 P.M; temperature about 14°.

1st, Iodide of silver obtained with an excess of acetate of silver discolored immediately after a few seconds exposure to solar light, and became deep green after fifteen minutes. The same iodide also discolored under the action of heat (from +62°.5 to +25°).

2nd, Iodide of silver prepared with an excess of acetate of silver and iodide of ammonium, discolors after a few minutes exposure to diffused light, and acquires a green tint. The same iodide, by the action of heat, also discolors, but the tint presents no special character.

X. *Experiments made with Iodide of Silver, obtained with Collodion.*

These experiments were made December 16, 1855; time; from 10 A.M. to 1 P.M; temperature about 15°.

1st, Iodide of silver prepared with an excess of acetate, gave a fine negative after ten seconds exposure by the aid of pyrogallic acid.

2nd, Iodide of silver obtained with an excess of iodide of ammonium, gave no result, even with pyrogallic acid.

3d, Lastly, iodide of silver prepared with equivalent quantities of nitrate of silver and iodide of ammonium, gave, after ten seconds exposure, a beautiful negative by the aid of pyrogallic acid.

The conclusions of the authors from these new and important labors, are worthy the attention of Photographers. They are as follows:—

1st, In summer, the temperature of the atmosphere being high, acetic acid must be employed in larger quantity in the pyrogallic acid solution, in order to diminish its reducing action. By this simple method, reduction takes place only on the parts affected by light, and not on those influenced by heat.

2nd, The tints presented by the different iodides under the action of light, generally accord with the following gradations:

For iodide of silver obtained from iodide of potassium, the tint is black, for that of iodide or cadmium, the tint is violet, for that of iodide of zinc the tint is blue-black, for the other, obtained from iodhydrate of ammonia, the tint is a reddish black, and lastly, for iodide of silver prepared with iodhydrate of quinine, the tint is a purple red.

3rd, All the iodides give a fine instantaneous positive proof, and the iodide of silver obtained from iodide of cadmium, gives an excellent instantaneous negative with collodion prepared as above indicated. It is to be remarked that all the collodions turn red more or less rapidly; that iodized with iodide of cadmium, on the contrary, always remain colorless.

4th, In a photographic point of view, iodide of silver obtained from the iodides of potassium, zinc, ammonium and cadmium, do not act in the same manner.

5th, By the action of light, iodide of silver discolors on the surface; the interior remaining perfectly intact. The action of heat, on the contrary, acts not only on the surface, but also through the entire substance of these same iodides. In a word, the action of light on these opaque bodies is superficial, while heat penetrates every part.

6th, Iodides of silver with excess of acetate of silver, are the most sensitive and the most impressionable.

7th, Lastly, the ordinary temperature of the atmosphere may reduce the sensitive iodides, without any previous action of light; and it is best to work in summer in places where the temperature does not exceed 25°. D. L.

THE OXYMEL PROCESS.

To the Editor of the Photographic Journal:

Otley, Oct. 14, 1856.

Sir,—My experiments lead me to the conclusion that there is more in Mr. Llewelyn's process than is sometimes supposed, and that it is peculiarly adapted to the circumstances of the amateur photographer. As practical communications have been asked for on this subject, if you will allow me, I will give your readers some reasons for this opinion.

Those who pursue out-door photography "regardless of expense," and the professional operator who expects to be reimbursed for his outlay, will still take out his cab or his car, or work with a tent and apparatus so "portable" as to require at least two persons to carry them. The absolute certainty with which good pictures can be taken with the ordinary collodion process, will probably induce such photographers to prefer that process to any other. There are many amateurs, however, who are engaged in business during the middle of the day, and who find it necessary to carry on their photographic pursuits with a due regard to economy. These want a method by which they can prepare their plates in the evening, after the business of the day is over, and then at any interval of leisure during the few following days take out the camera alone, and return home to develope the picture in the evening again. In practice, there seems to be but two ways of doing so;—either the collodio-albumen or the oxymel process must be adopted. In either case, plates may be perfectly preserved in a sensitive state for at least a fort-night, and as far as I know, equally good pictures produced at last. But, in my opinion, the oxymel process greatly excels in ease of manipulation and convenience. Look at the trouble of the collodio-albumen process—the two silver baths; or if, as my friend Mr. Hooper of Manchester suggests, only one bath be used, it constantly requires decolorizing and filtering—the two coatings—the two dryings, either in an oven or for three days without heat—the avoidance of dust, and bubbles, and blisterings, and stains in developing. When all is done to simplify it, the collodio-albumen process must be at least three times more troublesome than the oxymel one; and it must be remembered, that the risk of failure is often in proportion to the complexity.

On the contrary, the oxymel process is so simple, that any one working with collodion can immediately employ it. He re-

quires no substance, except honey, beyond what he is in the habit of using; and no additional apparatus but a couple of dishes. After his plate comes out of the silver bath, two dips into water and one into the diluted oxymel is all the manipulation required, in order to give the sensitive plate its keeping property; and after exposure, a wash with water suffices to prepare the picture for developement.

We cannot expect anything to be simpler; and as for its certainty, Mr. Delamotte says that "if the necessary precautions are observed, it does not admit of failure;" and Mr. Llewelyn makes the important announcement, that if the time of exposure be much longer than is absolutely necessary, a modification of the development will bring out a good picture notwithstanding. My own more limited experience leads me to infer that the process is remarkably easy and certain. I have not met with the inconveniences mentioned by Mr. Hardwhich in the Number for August. To-day, for instance, October 14, with an ordinary quarter-plate lens and half-inch diaphragm, in dull weather, I obtained a stereoscopic negative in two minutes for each picture. It was quickly developed with two doses of pyrogallic solution, and is quite equal to any collodion negative I ever took. Mr. Hardwhich doubts whether his oxymel has been properly prepared; and I observe, in the third edition of his excellent work on Photographic Chemistry, he has omitted to state that the pound of honey given in his formula for the preparation of oxymel should be the troy, and not the avoirdupois pound. My own oxymel was made according to the London Pharmacopæia, and consists of acetic (proligneous) acid 7 fluid ounces, water 8 fluid ounces, and honey 60 ounces troy, or about 4 pounds 2 ounces avoirdupois. I have sometimes observed very small holes in the negative film, which, however, did not affect the positive on paper, and might probably have been prevented by more careful washing. I have also found that the film is apt to come off in consequence of the repeated washings; but by using an adhesive collodion, by having perfectly clean plates with ground edges, and by pouring on the developing and fixing solutions, I can avoid this inconvenience.

I am, Sir, yours respectfully,
Edward Thompson.

CLAIM TO PRIORITY
In the Application of Honey to the Collodion Plate.

BY F. MAXWELL LYTE.

To the Editor of the Photographic Journal:

Sir,—In the last number of the Bulletin of the Société Francaise de Photographie appears a letter from M. de Poilly, in which he lays claim to priority in the application of honey to the surface of the collodion plate. This makes in all three several persons, viz. Mr. Shadbolt, M. de Poilly, and myself, who now claim this priority: it is but right that it should be settled in one way or other, and decided on behalf of one of the claimants. My process, which was published in "Notes and Queries" on the 17th June 1854, consists in the application of a syrup of honey and water, to which has been added more or less nitrate of silver, to the surface of the prepared plate; and one essential principle of the process is, that the plate, not being washed previous to the application of the honey solution, will not keep for more than some hours (say a day at most), but that at the same time a great increase of sensibility is obtained. At the same time, the power which I discovered of preserving the plate for some hours sufficiently establishes my claim to the use of honey as a preservative agent, since, except by the nitrate of magnesia process of Messrs. Crookes and Spiller, the collodion plate had never been preserved in the sensitive condition more than as many minutes. Also, if no nitrate be added to the honey, but the pure syrup be directly applied to the unwashed plate, the essential conditions of my process are equally met.

The pictures exhibited by me in the Universal Exposition at Paris were nearly all printed from negatives taken by my process, and I may add, that, previously to my publishing this process, negatives produced by it were exhibited by *me* at the Royal Institution. I also claim to have spoken of the great stability given to the sensitive plate by this process in this my first communication. After I had published my process, Mr. Shadbolt published one in the Photographic Journal for the ensuing month, containing the essential difference, that he washes the plate with water before applying the coating of syrup. This process I consider to be essentially but a modification of my own; and although in all fairness I must allow that I believe Mr. Shadbolt to have been independently working in this direction simultaneously with myself, still I think that I on the other hand may fairly claim, at least as far as England is concerned, the priority of invention in the honey process, and that Mr. Shadbolt should be content to take to himself the modification of washing the plate before the application of the syrup, a modification certainly called for where the prepared plate is to be kept over more than one day. In all these cases one of two inventors must be the first to publish, and to him who is thus fortunate is, I believe, always ceded the honor of priority in the invention. But now steps into the field a fresh competitor, in the form of M. de Poilly,—a French gentleman, who states that, before even my process was published, he had made a communication on the same subject to the Institute of France. I think then, on the whole, that the honey process is one of such importance (as creating an era in photography) that the Council of the Photographic Society may fairly consider the question; and at the same time that they settle the validity of the claim of M. de Poilly (which they can easily do on reference to the 'Comptes Rendus' for the year 1854 and before the month of June in that year), they should at once and definitively determine on the rival claims of Mr. Shadbolt and myself. Such a decision could not fail to satisfy all parties.

I remain, Sir,
Your most obedient Servant,
F. Maxwell Lyte.

PHOTOGRAPHIC PROCESSES AND THEIR RESULTS.

To the Editor of the Photographic Journal.

Sir,—Just now there appears to be a kind of *restlessness* amongst photographers,—a desire to seize on some *new* process, as though the old ones were worn out! To me this seems the height of absurdity, as I have seen enough to prove that every negative process will produce first-rate pictures; and that most, if not all, of the difference in photographs is entirely owing to the operator. Certain, however, it is, that manipulation overcomes all the disadvantages of each process; and that specimens of every process, when chosen from the port-folios, are so nearly equal, that any man would be puzzled to decide which is the best!

This opinion has lately been forced upon me from seeing some waxed-paper productions. All will admit that this process, *in ordinary hands*, is equal in decision and sharpness to the other methods—albumen, collodion, or even calotype, when on good paper; yet that this will produce pictures equal to anything, not excepting collodion, is made plain from many results lately exhited, more especially those of Messrs. Mudd, which I believe are all from wax-paper negatives. Their rocks are very beautiful, and none but an experienced photographer would find any difference betwixt their pictures and those on collodion; and even on careful examination, it is only a scarcely perceptible and *very* faint appearance of a flaxy (I can find no other word to express it) surface to the water, which raises a doubt as to their being from glass. Minuteness, boldness, and artistic effect can be produced together by this process, when worked well, but if we look upon the waxed-paper production of most operators, we shall find uncertain outline, dirty shadows, and an utter want of anything like boldness anddecision in affect.

Again, in nine out of ten pictures from collodion negatives, taken in a good light, the whites are so glaring in contrast, that it is almost painful to look upon them long together. Where the sunlight falls on the brick walls, it looks as though each in-

dividual brick had been a polished reflector; it is not exactly, solarization, but an utter want of softness that totally destroys anything like *atmosphere*, making the distance hard and unnatural and giving the water no surface. Perhaps many may question this, or attribute it to the process itself; but the absence of anything of this kind in some of our best photographers, proves it to be want of skill in the workman.

In the Calotype it is often the same. If there is any paper process that rivals glass in definite outline and sharpness: it is this, WHEN WELL WORKED. One thing, however, clogs this process, and that is, the difficulty, if not impossibilty, of getting good negative paper; when, however, good paper is used by a skilful photographer, no man can tell calotype productions from glass; but from the usual specimens exhibited, any one seeking a process would most certainly avoid this. That it will, however, produce good results, can be proved, and by care the best which are exhibited may be equaled.

Now for the deduction from the above. If every one would strive to bring more artistic taste into his photographic productions, instead of blaming this process, the result would be that the art would be raised very near to the productions of the painter. Go to the finest exhibition you can, and from those produced by the process you use, choose the best, and resolve to rival them. In photography "a rolling stone gathers no moss," as truly as in everything else; and changing from process to process only betrays a restless indecision that often is incapable of being quieted, and seldom, very seldom, produces anything worth the trouble and expense it occasions.

But to obtain good results, more, perhaps, depends upon printing than upon the negative process; and I do not hesitate to say, that the former is the more difficult. A thorough knowledge of it is required: each negative requires its own treatment; and very often it is impossible to get a good impression in the sunshine, when with ordinary light the picture is excellent. This part of photography cannot be taught, though instruction assists very materially the beginner; and every person must be content with inferior results for a while. Nay, I go farther than this: the great difference betwixt our best (most artistic) photographers is in printing *from*, not producing, the negatives. Let a beginner take a copy from his production, and then get another by some experienced person, and he will scarcely believe they are from the same negative.

Of course, in the above I refer to *landscapes only*; and, as I said before, it would be no easier task to decide which process, when perfectly worked, produces the most beautiful results.

Yours obediently,

THETA.

UNIVERSAL EXHIBITION OF PHOTOGRAPHY, BRUSSELS.

REPORT BY DR. PHIPSON.

[*From the 'Cosmos' of Oct.* 3 *and Oct.* 12.]

THE Exhibition for encouraging industrial arts in Belgium, offers a great attraction by its photographic department, which is without doubt its most important feature. Proofs from Belgium, England, Italy, Switzerland, and even Hungary and America, occupy a place near those of the French artists. It is the first time that Belgium has had so good an opportunity of comparing her photographs with those of her neighbors, and of studying photographic art from artists of other countries.

Before entering into details respecting the photographic proofs which adorn the walls of the Exhibition, we might make some great distinctions between the products of the different nations which we have named. But, first, we notice the *number* of proofs exhibited, which is far from being equal from all the exhibitors. There are a great quantity of French and Belgium proofs, a smaller quantity from England, Italy, Germany, and Switzerland, a very small number by one single Hungarian artist, and scarcely a dozen from America.

If we could judge of European photography from this Exhibition, we should say that Belgian photographs have been far surpassed by those from other countries. It is for the interest of Belgium that the present Exhibition has been instituted, and Belgium will derive most benefit from it with regard to photographic progress, from the lessons given by her neighbors. No country can complete landscapes, with those of English photographers. Italy, France, and Germany contend for the first rank in monumental photography; and as to Hungary and America, the few pictures they have exhibited remind us somewhat of the infancy of the art, especially by the side of French and English proofs, although we find a few of their contributions of interest.

In the following Report we will follow the order in which the photographs have been exhibited, and if at times our judgment and insufficient knowledge subject us to reproach, at all events no one can accuse us partiality,

Belgian Photographs.—M. Barboni, of Brussels, has given some charming stereoscopic pictures; but several are colored, and we are once more obliged to notice the bad effect produced by the addition of coloring to such proofs, an effect much more apparant in stereoscopic than in general pictures. Colored images are no longer at all natural; the *truth of nature*, to speak artistically, has completely disappeared; and objects thus represented resemble the painted wooden dolls to be bought at fairs. Photographic proofs of the triumphal arches in the Brussels fêtes, and an oval portrait of two Spanish dancers, are M. Barboni's best productions.

The portraits exhibited by M. Daudoy, of Namur, fail a little in neatness, but deserve to be mentioned for their artistic expression and sentiment.

MM. Delahaye and Slaytes, of Antwerp, M. De Schodt, of Bruges, M. Dhoy, of Ghent, and M. Dupont, of Brussels, have exhibited proofs tolerably successful. Mention may be made in particular of direct positives on glass by MM. Delahaye and Slaytes, and proofs by M. Dupont, remarkable for their resemblance to Rembrandt. M. Dhoy's proofs are very original; the comic scenes which they represent are of a rather vulgar characteristic, but very expressive. MM. Ghemar and Severin, of Brussels, have exhibited a great number of photographs. We notice, above all, enlarged portraits painted over in crayons—a very happy application of photography, and which, in the artistic hands of M. Ghemar, has produced very fine results. We may also mention a good portrait of M. Jobard, Director of the Musée Industrie, and copies of pictures, some of which are very successful.

Madame L., of Brussels, has exhibited photographs from nature on paper, and without any retouching. Her views of Malines, of the Bois de la Cambre, near Brussels, warrant us in placing Madame L. in the first rank among the photographers of her country.

Some portraits, without retouching, of M. Leba, of Brussels, also deserve mentioning.

We regret that M. Pavonet, a distinguished amateur of Brussels, has not exhibited some of his specimens, as he would have sustained the honor of Photographic Belgium.

French Photographs.—Most of the French photographs at the Brussels Exhibition were seen at the Paris Universal Exhibition, so that we may dispense with a special detail of them. Many of them rank high in the art, and are known to every one. Portraits of M. N. Nadar and M. Tournachon Nadar have been much admired. Among the pictures of the last artist we must especially mention amplified and retouched portraits of M. de Lamartine, M. Decamps, &c-, which are remarkable for their breadth of treatment. The contemporary portraits by M. Nadar are considered by connoisseurs as the finest in the Exhibition. The monumental reproductions by MM. Bisson and Baldus are extremely remarkable, and have already obtained for their authors a well-deserved fame. We should not be astonished if some day one of these photographers on a large scale succeeded in taking the whole of Paris at once. The size and clearness of their proofs attract general notice. M. Le Chevalier Dubois de Nehaut, of Brussels, (member of the French Photographic Society), has exhibited a quantity of views taken on the occasion of the July fêtes at Brussels, which represent processions, fountains, carriages, &c., taken instantaneously.

They consist of very remarkable pictures, of which thirty-one distinct negatives may be counted.

MM. Bertsch and Arnaud have exhibited portraits done on instantaneous collodion. It would be difficult to find their equals. Their microscopic reproductions are extremely interesting with regard to natural history. Animals completely microscopic are represented, such as the Acarus, one inch long, and, in spite of these dimensions, of perfect clearness. M. Louis Rousseau's proofs (photography applied to natural sciences) strike us also by the clearness, exactness, and beauty of their details; they are, perhaps, the happiest application of photography. Sponges, corals, bones, skulls, &c. are to be seen, which are much more adapted to teach natural history than the best drawings by hand.

The newest production of M. Belloc, is, without doubt, his experiments in photo-lithography, so much admired in Paris. Some of his portraits are admirable, although rather cold; it would, however, be difficult to do better.

M. Duboscq has exhibited stereoscopes, as perfected by Mr. Knight and himself, the glasses of which are square; and we noticed some charming stereoscopic proofs on glass by M. Ferrier.

We have from E. Thierry, of Lyons, a few well-executed proofs; and we admired the reproductions of old engravings of Marc Antonio by M. Delessert, near Paris. M. Cliffort, of Passy, has shown by some extraordinary pictures what can be done on paper.

M. Nièpce de St. Victor has exhibited a specimen of heliography. It is a view taken directly on steel, in the camera obscura. The proofs by M. Tiffereau, of Paris, reproducing views taken in Mexico, are very interesting. The heliographic engravings of M. Riffaut, of Paris, are very near perfection. We have never seen anything more happy than his views of the Tour de l'horloge, the Louvre, and Notre Dame; the heliographic engravings, without retouching, on steel, by M. Nègre, of Paris, are also very remarkable. An immense view on paper, exhibited by that photographer, has attracted every one's attention. We must also make especial mention of the photo-lithographs, by M. Poitevin, of Paris, remarkable for their clearness above all the other pictures of the kind, and we know that now he can actually do much better.

English Photographs.—Mr. Maxwell Lyte has exhibited twenty photographic pictures on collodion, done by different processes invented by him: his landscapes are remarkable for their beauty.

The English part of the Exhibition consists almost entirely of landscapes and *genre* subjects. English landscapes have a character quite peculiar to themselves; they are generally remarkable for their wonderful delicacy of detail and the sharpness of outline, joined to artistic feeling and good taste in the choice of subjects. The studies and landscapes of Mr. White, of London, have particularly struck us, and we can say that they have elicited from connoisseurs an admiration without bounds; his charming "Views on the Thames," his "Studies of Hedges," and his "Corn-field," surpass all that has been done as yet in this way.

Mr. Archer gives to his photographs a character quite peculiar, difficult to describe, but which distinguishes them among thousands. His most astonishing productions are clouds taken at the same time with the landscape, which are evidently natural from their remarkable shapes. This distinguished photographer has also given us pictures removed from glass by means of gutta-percha, which deserve to be mentioned, and his views of streets and interiors are very striking.

M. Roger Fenton has maintained his artistic fame by admirable pictures; we would notice above all his "Rivaulx Abbey," his "Hampton Court Palace," and several proofs, in which the clouds are taken at the same time with the landscape.

Mr. Sedgfield's Calotypes do honor to English photography, as well as his pretty landscapes, and studies of hedges and bushes. A portrait (probably from a picture of Sir Joshua Reynolds') forms a very remarkable specimen of a copy from an oil painting.

Mr. Gething, of Newport, Monmouthshire, has exhibited some very fine landscapes. Mr. Cox's proofs, although some are not bad, do not generally come up to the degree of perfection which is evident in the productions of his countrymen.

Mr. Rejlander, of Wolverhampton, has given us many *genre* subjects, the expression of which is astonishing; the very thought of each individual is fully expressed in his face. The *naivete* and good taste shown by M. Rejlander in the choice of his models cannot be too much admired. We would also mention a study of "Hands" and "The Young Philospher," as charming specimens of the same artist.

The "Grasses," "A Piece of Muslin," and "A Fern-leaf," by Mr. Fox Talbot, are worthy of inspection.

The stereoscopic proofs of M. Claudet, of London, leave nothing to desire with respect to form; but does not the coloring, although a masterpiece of the kind, rather spoil them as regards art? The models have been chosen with much taste.

American Photographs.—Among the clever American proofs, we can only mention a portrait of Mrs. Beecher Stowe, interesting rather on account of the fame of the authoress of "Uncle Tom's Cabin," than as a photograph. Mr. Whipple, of Boston, who is the artist, has some other proofs, which offer nothing remarkable. It is fair to add, that these proofs are from the collection of M. Lacan, of Paris.

Italian Photographs.—The Italian photographs in this Exhibition are almost all monumental views. We must first mention a very valuable proof by M. Secchi, of Milan, viz. "The Last Supper," of Leonardi da Vinci, from the existing original in the old refectory of the church of the Madonna della Grazia at Milan. This fine picture is very valuable as regards art; because the fresco is disappearing daily, and a portion of the wall has been already replaced by masonry; engravings have never reproduced the fresco so perfectly. The great pictures of monuments of this photographer do not reach that perfection remarkable in those of MM. Baldus and Bisson; the cause of it is, we believe, in the difference between albumen and collodion.

The views of ancient and modern Rome, and of the statues of its museums, by M. E. Brann, of Rome, attracted our notice for their clearness and accuracy.

M. Perini, of Venice, has excited much admiration by his charming views of that town; above all, we would name his "Saint Marc," and his "Palace of the Dodge;" then his "Giant's Staircase." Several of these fine pictures were soon bought by connoisseurs, on account of their beauty.

In the collection exhibited by Dr. Lorent, of Venice, we also find equally remarkable pictures; his "Lion at the Arsenal of Venice" is quite a phænomenon in photography.

MM. Alinori, frères, of Florence, have sent a great number of pictures, most of them previously exhibited in Paris, and well known for their beauty. We can add nothing to the praises which have been already justly lavished on these Italian artists. Bronze was never reproduced with more truth than in the magnificent copy of the "Gate of Ghiberti" in the Baptistery. Michael Algelo always kneeled when passing by the original; amateurs should also kneel before M. Alimori's photograph. From the same photographers we have interiors, monuments, and frescos of great value. The other Italian photographs naturally attract much admiration on account of the beauty of the monuments they reproduce.

German, Swiss, and Hungarian Photographs.—M. Oppenhein, of Dresden, has exhibited thirty-six pictures, most of them of great beauty, and the subjects are chosen with rare good tastes. Above all, we would name his "El Mirab," which seems to us one of the finest proofs in the Exhibition.

M. Adlich, of Berlin, has sent some very fine reproductions of engravings from Raphael, Murillo, &c.

As much may be said of M. Kramer, of Cologne. The best German portraits have been exhibited by M. Hanfsægl, of Munich, among which that of the celebrated "Pepita" is very striking.

Dr. Harless, of Munich, has exhibited photo-lithographs by processes of his own invention; his proofs represent pictures,

casts, drawings, &c. There is, however, a want of neatness, which gives them an unfinished appearauce.

We must not forget the beautiful albums of Baron de Minutoli, of Lieguitz, Prussia, of which there are several folio volumes. The pictures represent objects which form part of the rich collection of antiquities, glasses, cups, &c. of that distinguished amateur.

M. Durheim, of Berne, has sent proofs of landscapes and portraits, several of which are remarkable for their size.

M. Roth, of Kaschau in Hungary, is the photographic representative of that country at the Brussels Exhibition; his portraits and studies of heads are tolerably well done.

Photographic Objects.—Before concluding, we must mention a few photographic objects to which we have not yet alluded. In the first place, the lenses of M. Jamin, of Paris, have attracted general notice. An immense objective for landscapes is 14 inches in diameter, and will take a picture about 3 feet square. By the side of numerous lenses which Jamin has exhibited, we see a full-length portrait, obtained on a plate of glass of a foot and a half by 2 feet, with a double objective of 6 inches in diameter, with a centraliziug cone; and also a proof of the Louvre, obtained by M. Bisson, on a plate of 3 feet in height by 2 feet in width, with a single objective of but 7 iuches in diameter. These proofs speak better than we can for the excellence of these lenses.

At the same time we must mention the photographic chemical preparations of MM. Dufau and Desespringalle, of Lille, which appeared to us very carefully manufactured.

M. Delahaye, of Paris, has also exhibited excellent chemical products, and a travelling-chest with bottles; as also have MM. Laurent aud Casthelaz. We also noticed vertical and oval baths from M. Delahaye, which seem to us very well adapted for the silver bath; as well as his pyrogallic acid jar.

It is needless to speak of Marion's papers, already sufficiently known by photographers.

To couclude, we may state, that the locality allowed photographic proofs generally to be placed in a good light, and that the Exhibitiou attracted great crowds, both of foreigners and Belgians; and, lastly, that the opportunity so happily offered by this Exhibition of comparing the works of different countries, cannot fail to have a beneficial influence on Belgium itself.

P.S.—We have improperly forgotten to mention three untouched heads, being a part of the collection of MM. Pesme and Varin, of Paris, which have not their equal iu the whole Exhibition; they resemble very fine lithographs; the deep black, or dark brown color, which gives to many photographic portraits so sombre and dull an appearance, does uot exist in them. The head is drawn on white paper, with just enough ground to give proper relief. Add to this, that the features of the face are of perfect delicacy and clearness, and you may form some idea of these beautiful studies. If we have not insisted on the merit of the excellent pictures of M. Legray, who pushes the *modele* of his photographs to its last limits, it is because their praise is already in every one's mouth, and so it did not seem necessary to bring them prominently forward. T. P.

The following account of the English portion of the Brussels Exhibition, extracted from the Bulletiu of the Freuch Photographic Society, may also be interestiug.

"Having reached the eud of the gallery and turned to the left, we land in England. The whole suddeuly assumes a new aspect. The English are essentialy collodionists and landscape artists. Their works are never of a large size; they seldom produce a plate 24 × 30; and they treat their photographic pictures with a peculiar skill reminding ns forcibly of their special kind of aqua-tint engraving, such as we see in the charming landscapes with atmospheric effects which ornament their Keepsakes.

Of all the English Exhibitors Mr. Rejlander, of wolverhampton, is the only one who seems to attempt, besides portraits so called pictures of *genre* and of animated nature.

We look with the greatest pleasure in this exhibition at his 'Market,' in which persons, horses, and carts are rendered most clearly, thus testifying to the extreme rapidity of their execution. Among his *genre* pictures 'Drunken Barnaby leaving the tavern, reminds us of a first-rate Teniers. A pair called 'Jane and John, on Saturday and Sunday' also form two charming *genre* subjects. In these two little pictures the expression of the faces shows, better than words, all that has passed from one day to the other, ending in a walk together which does not look as if it were too amusing at the outset. Of another class of pictures, by Messrs. Cox of Devonport, Dodd of Londou, Gething of Newport, Johnson of Blackburn, &c., it is difficult to form an opinion or make choice of the best operator, all are so much alike. They consist of dockyards, wharves, and remains of monuments of all kinds with beautiful distances well rendered. Mr. Archer exhibits a series of skies taken at the same time as the landscape, and in looking at them we can but wish that this kind of operating may become perfect and general. Salisbury Cathedral, Warwick Castle, and a perspective view under the arch of a tunnel, by Mr. Sedgfiield of London, are without doubt very fine pictures.

The studies of trees by Mr. Gething of Newport and Mr. Taylor of Godalming cannot be found fault with; but the collecttions of Mr. Fenton and Mr. White of London ought to fix the attention. Nothing cau be fiuer in detail or clearer than the 'Corn Field,' with the oats just being cut, the ferns, the brambles, aud the edges of ponds, by Mr. White; and uothing is more remarkable iu the photographs of Mr. Roger Fenton than the delicacy of foliage combined with the aërial perspective. It is landscape photography pushed to the last degree of perfection.

It is said that the fogs of Great Britaiu are favorable to these effects of gradation of distance we get so seldom in France. This shows that in everything evil there is some good. The perspecttive of the different distances thus obtained is really so remarkable and offers besides coutrasts so striking, that we might be tempted to think that it had been made by screens skilfully applied to produce the delicate variety of distant tints; and if it were so, could uot say a word against it, since it is the means of arriving at so satisfactory a result.

Mr. Maxwell Lyte, Member of the London Society, Residing in France, and whom (with Mr. Fenton) we are happy to reckon among our colleagues, had his pictures sent to Brussels with ours, and they have naturally been placed in the part assigned the French Society. We have already expressed our appreciation of their incomparable merit. The magnificeut collection at Brussels furuishes us with a fresh opportuuity of stating that Mr. Maxwell Lyte could with good reason claim the honor of figuriug in the front rank among his countrymen by the side of Fenton and White.

M. A. Claudet, Member of the London and of the French Societies, has exhibited in one of the Upper Halls of the Museum a very beautiful series of stereoscopic pictures, portraits and studies after living nature. It is enough for us to say that these pictures are not at all inferior to those which M. Claudet sent to the Universal Exhibition at Paris.

All the visitors then showed such evident admiration that they ought not to have forgotteu them. We can but regret however that pictures so fine should be colored."

For the Photographic and Fine Art Journal.

TATUM'S PATENT OIL-GROUND PHOTOGRAPHS.

In the whole history of Art in the production of portraits of the highest order, no single improvement has contributed as much as this new process. All that has been developed by science in the use of the camera and the light of the sun, so wonderfully sucessful in the Daguerreotype, Ambrotype and Photograph, have been appropriated by this new process to large pictures on the most perfect and durable of all grounds to receive the plastic touch and exquisite tint of the artists brush.

Real oil paintings in oil grounds upon canvas, such as has always been regarded by the masters of art as the best receptacle for colors in oil, are now readily produced with all the truth of the daguerreotype in delineation, and of living, breath-

ing, blooming nature in color tone and expression, from the miniature up to that of life size, with a facility and cheapness that is astounding even in this age of steam, electricity and intellectual progress. Portraits the size of life may be secured from small daguerreotypes of persons deceased, with as much truth and accuracy as from the living subject.

Sittings from the living subject are almost entirely dispensed with, and the finished portrait delivered in one or two days from the order.

The durability of these oil-ground photographs is insured for a hundred years, if desired, as there is no chemical or foreign matter used or introduced that can in any wise affect the permanency or durability of the picture, the ground being the same as has been most approved and that ordinarily used by artists in portraiture and landscape; the vehicles and paints are also the same.

Mr. Tatum, the patentee, with a mind well stored with scientific truth, and possessing an enviable skill in the higher walks of art, has thus, in his last achievement, and the liberal terms offered his fellow artists in prosecuting his new process, not only reflected credit upon his native country in the great race of human progress, but done great honor to his own head, hand, and heart, and doubtless will receive from an obliged people the reward due his arduous toil and brilliant achievement.

A Photographer.

CRACKING OF BLACK VARNISH.

To the Editor of the Photographic & Fine Art Journal:

289 Broadway, Dec. 1, 1856.

Sir,—Your expressing a wish for some information with respect to the cracking of black varnish, in connection with "O. S. B.'s" communication in your last October number, induces me to offer a few remarks.

I have no doubt that the cracking of the black varnish referred to by O. S. B. arises from the use of amber varnish, as I have by me a positive picture taken about three years since, which I covered with amber varnish made by myself, and which in about one year afterwards began to crack and peal off at one corner, and went gradually up the glass to the opposite one, taking with it of course the collodion.

This may have happened sooner if, as was not the case, the black varnish had been put on the amber varnish, and on this point, I am almost led to a positive conclusion, as your communicant says, "one only of my negatives has gone as yet in this manner,"—again, "the dissolvents of the bitumen and amber are so very opposite, that the inclination to cracking would doubtless be accelerated."

I am therefore inclined to think that the complaint, as you say so generally made, about the cracking of black varnish, is chiefly in consequence of the varnish used before putting this on; and as a further proof I may say, that I have a positive picture taken one year since, and several others, which I could refer to, taken much earlier, and which I know were first covered with the ordinary negative varnish, and some not, not one of which shew the slightest inclination to cracking, all having the black varnish on the picture side of the glass; in fact I have not yet seen a cracking picture when these two varnishes have been used.

Is not the cracking of the varnishes used by coachmakers and painters referred to by O. S. B., attributable to the expansion of the materials on which they are put?

I am sir, yours obediently,

Jno. Cartledge.

OUR ILLUSTRATIONS.

We endeavor this month to make up to our subscribers in illustrations for our short comings during the year. We present them with ten photographs consisting as follows,—

A Portrait of Milliard Fillmore, from a negative by Meade Bros., of New York city. This is an excellent likeness. The negative was a very fine one, and would have given very fine proofs, had not our printer injured it before she had taken twenty impressions.

Two Views in Hoboken, N. J., with New York in the distance. The negatives were taken by an amateur, from the roof of his residence. They at first worked very clear, but having been varnished with poor varnish, or not having been sufficiently washed before varnishing, they turned quite yellow, and consequently printed dull and heavy.

"*The Old Man of the Mountain*," of the White Mountains, N. H.; the negative taken on the spot by F. White, of Lancaster, N. H. This picture shows the capabilities of the photographic art in delineating nature truthfully better than any other we have published, and affords a field for study, under the magnifying glass, which no pencil can possibly give; presenting to the view many remarkable points which could not possibly be detected by the eye in looking upon this remarkable work of nature itself. It also furnishes a forcible argument in favor of the pre-Raffael principle of painting.

The Sewing Girl, from a statuette by Magne, lately on exhibition in the New York Crystal Palace.

The Soldiers Son, also from a statuette by Magne, at the Crystal Palace. The negatives are by Messrs. Whipple and Black, of Boston, and produce very fine proofs.

Market Square, in Nashville, Tenn. A very fine picture; the negative taken by Messrs. Dodge and Wenderoth, as was also that of the

Court House in the same city. These are both very fine negatives, and the defects in the positive proofs, as well as in the others, are principally owing to the quality of the paper, *Canson freres*, which does not come up to the excellence claimed for it. We form this opinion from the fact that the proofs taken at the same time, and by the same process upon other paper—"*Saxe*"—are very fine. We have printed nearly all the photographs found with this number on the Canson paper for the purpose of thoroughly testing it, and we have only one conclusion to come to—either that Canson freres make very poor paper, generally, or that they select the poorest for the American market, a very foolish and short sighted policy.

The "*Sleeping Children*," from a statuette in marble by Geefs, and the

First Steps by Magne, are from negatives by Whipple & Black, of Boston; two of the best in this collection.

These proofs have all been printed by the process laid down by Mr. Hardwich in the first edition (*American* published by H. H. Snelling, 93 and 95 Duane-Street,) of his Manual of Photographic Chemistry, pages 208, §c, and 212, §c, substituting chloride of silver to saturation for the nitrate in the fixing and toning bath.

Personal & Art Intelligence.

— Our present issue closes the *ninth volume and the sixth year* of the Photographic and Fine Art Journal. This is a result we could not have anticipated six years ago, had we listened to the fears and advice of friends, who unlike ourselves, did not think that there were a sufficient number of readers to be found among Daguerreans to sustain such an enterprise. Notwithstanding the difficulties that have presented themselves, to prevent our accomplishing all we desired during the year 1856, our Journal has not only maintained the circulation of former years, but it has gradually continued to increase. Each year has added to our list of readers, and we certainly have little to complain of in that respect, and have much with which to congratulate ourselves in the sympathy and encouragement given by our subscribers.

For the present, matters look much more encouraging in our photographic department, and we have every reason to believe that the future is bright before us. We have endeavored this month to supply the omissions in former months of our photographic illustrations; and we think our subscribers will perceive some improvement in the quality of the proofs. We have no

doubt, this improvement will continue until we arrive at perfection. At all events we can safely promise, that our illustrations for the coming year will be far better than heretofore. It is so recently that we have been enabled to procure a person on whom we could depend, to print our photographs, that we have found it impossible to send with this number, the full complement of photographs due to each subscriber. We have therefore distributed those we have printed in such a manner, that each subscriber will receive at least two with this number. The others will be sent by mail, postage free, during the present month. Those of our subscribers who did not receive photographs with their numbers *previous to August*, will please make known to us what are missing, and we will furnish them as fast as possible.

— Photographic Exhibitions.—We copy the following from the *London Journal of the Photographic Society*, as of considerable interest to the Photographic world, and in the hope that it may induce some feeling of pride in our own artists. There is nothing that humbles our pride in the general success of the photographers of this country so much, as the apathy they evince in the public improvement of the Art, and in the cultivation of its scientific principles, and that we have to draw so largely upon foreign material for the purpose of journalism. Instead of relying so almost entirely upon foreign writers for the contents of our Journal, our great aim is to make it entirely original, and thus return the many obligations we are now under to them. It would be very easy to establish a permanent photographic exhibition in the city of New York, that would attract crowds of visitors and render great service to the artists themselves :—

"Photographic Exhibitions are following each other in rapid succession. The Brussels display seems to have excited great interest, and to have given universal satisfaction. In the absence of any original information, we have laid before our readers the Report by Dr. Phipson, published in one of the French Journals. It will be seen that high praise is given to the English Exhibitors for their skill in particular subjects, and for their general delicacy of treatment. The prizes are to be awarded some time this month by a jury of photographers composed of representations of each nation exhibiting.

"This Exhibition closes on November 4th; but photographic artists are now appealed to by *three* fresh contemplated Exhibitions; and their well-known zeal and industry will doubtless enrich all these with numerous and beautiful specimens.

To begin at home. The Norwich Photographic Society announces an Exhibition to open on the 2nd of next month, which is to be attached to a Fine Art Exhibition in connexion with the Government School of Art. Contributors are requested to send their pictures framed, if from London or its vicinity, to Mr. Joseph Green, 14 Charles Street Middlesex Hospital; if from elsewhere, to H. Pulley, Esq., School of Art, Norwich, on or before the 24th inst. The pictures will be exhibited for sale, if the owners wish.

"Again, the Crystal Palace Company advertizes a winter Exhibition of Photographs, to be opened next month. This concurring with the close of the Brussels Exhibition, will enable contributors to send specimens which attracted notice there, together with fresh productions. The Company offers to pay the expense of transport, and to sell the picture for the exhibitors, charging 10 per cent. on the profits.

"Lastly, the French Photographic Society have fixed the opening of their second Annual Exhibition on the 15th of next month, and its close on January 15. Pictures are to be sent to M. Martin Laulerie, No. 11 Rue Drouot, by November 5th, with a letter, signed by the exhibitor, stating the number of pictures sent. Nude subjects are excluded, as well as colored and retouched proofs. The name and residence of the authors, together with the negative process employed, are required; and any further particulars, as well as the negatives themselves, will be gladly received. Prices are not to be affixed to the pictures, but communicated to the Agent and Secretary, M. Laulerie. All kinds of apparatus and products used in photography are admissible.

"To the Edinburgh Exhibition we drew attention last month, and with this catalogue before him no photographer can complain that he has not opportunity to display, and, if he wish, find a market for his skill.

"The Council of the Society of Arts is about to publish a list of objects connected with science and the useful arts, which they think foremost among the wants of the day, and they propose to reward by premiums inventions or improvements in any of them. Among the list we find the following photographic desiderata:—

1. The successful application of some new means (as electricity or *photography* for instance) for producing ornamental colored designs in woven fabrics, which shall be cheaper and easier of application than those at present employed.

2. A negative photographic paper, uniform in texture, suitable for waxing, and of better quality than any at present in use.

3. Some chemical or mechanical process for fixing or engraving the collodion photographic image on its plate of glass, so that it may be employed ornamentally in windows, &c., or as a matrix for obtaining impressions on paper.

4. A new process for transferring to porcelain photographic images, which may be permanently fixed by being burnt in, and enamelled on the surface.

5. Any improvements and extentions of the processes known as "nature printing," to be accompanied by specimens.

"These are valuable suggestions, and it is to be hoped may be productive to substantial results. To the photographer who practices the paper processes, the second item of the above catalogue must present great interest, since nothing can at present be more annoying than the uncertainty of negative paper, nor has the cause been yet satisfactorily accounted for, or apparantly attempted to be remedied by most manufacturers."

— Mr. T. J. Bailey of Columbia, Tenn., has sent us two very excellent positive proofs. He is decidedly improving very rapidly, and must soon acquire a proficiency few enjoy. We have sent the book and answered your letter by mail.

— We clip the following from the *Utica Daily Gazette :*

Davie's Gallery.—Saturday last we visited Davie's Gallery, Devereux Block, and spent a half hour most agreeably. Among the numerous gems of art which adorn this Gallery are portraits of some of our first citizens—J. A. Spencer, John E. Hinman, Mayor Hubbell, Spencer Kellogg, and others—also a fine likeness of Daniel Webster. Those who wish to "see themselves as others see them," should call on Davie, as did the editor of the *Teetotaler*, who publishes the following in his last issue;—

Fine Arts in Utica.—Desirous of handing down to the next generation a copy of ourself, we called on Mr. Davie, a few days since, for the purpose of testing his skill in sunlight drawing. On entering his Gallery, the first object that caught our eye was an oil painting of Daniel Webster as large as life, and seemingly possessing life. Its relief from the canvas is such as to give it the appearance or effect of a statue more than an oil painting. The drawing for this painting was photographed from Mr. D.'s original daguerreotype of Webster, and as a likeness and work of art, we think it is not surpassed in this country. On the right of Webster stands the venerable Clay, in equally bold relief, and not less interesting as a study than the bold face of the former. This is photographed the same as the one of Webster, and both are, we judge, complete triumphs. He has also on exhibition, a copy from D'Laranche's Head of Christ, which has won great admiration in the Vernon Gallery, and the Repentance of Eve, which was designed by Mr D.; the former representing Christ looking back to and weeping over Jerusalem: while the latter presents fallen Eve, still clinging to the apple, overwhelmed with sorrow and shame. Both are so full of spirit and truth, that they answer all questions respecting themselves.

Mr. D.'s taste does not run to portraiture exclusively. His Moonlight View in Holland, The Storm at Sea, Niagara Falls, The Suspension Bridge, Trenton and Genesee Falls, are all living representations of those great natural curiosities. There is also on exhibition at this Gallery, several life-size portraits of our oldest citizens: Spencer Kellogg, John E. Hinman, J. A.

Spencer, J. Watson Williams, Mayor Hubbell, Rev. Mr. Lincoln, and others; all so life-like that one feels while in their presence, the pleasure of familiar faces and good society. No one who cherishes in his soul, the smallest love for the art of painting, can fail to enjoy an hour or two among his collection. In the art of painting and coloring photographs, Mr. D. has placed himself in the front ranks, and the liberal patronage that our citizens have bestowed upon him within the past year, has been justly bestowed.

But few men would have ventured the contract he made with his artist, Mr. Francois, and still fewer could have matured the matter with the success which has attended his efforts. The amount of pictures, including daguerreotypes, photographs and paintings that have been made at his place since last April, is almost incredible, and with his brother assisting him in photography, and Mr. Francois in painting, he is prepared to make work of the highest order, and give the best satisfaction.

— The Photographs sent with the following letter, are indeed very fine specimens of the art. They are very round and sharp, delicate in outline, and soft in tone; the effect of light and shade very artistic and pleasing, the high lights well brought out, while the shadows, even in the most intense parts, quite transparent. On the whole, we see so little, if any thing, to find fault with, that we must say they give the very strongest recommendation to the toning bath described in the letter. We hope to receive the promised communication.

Cincinnati, Ohio, Nov. 17, 1856.

H. H. Snelling: Dear Sir,—I take this opportunity to send you a couple of photographic impressions; they are fair samples of the quality and tone of plain photographs as now turned out at Porter's Gallery in this city.

I want to have your opinion on their "looks," compared with what you see around you. I do not pretend to their surpassing all other productions, I only want you to notice one thing, that there is no trace of *sulphurization*, no yellowness of half tones, the sure indexes of later destruction. No sir; what I claim for this style of printing, or rather fixing and toning of impressions, is merely fine and durable impressions produced by a *simple* and *economical* process.

After the print is made, it is immersed into the bath which tones and fixes, and nothing but washing in water remains to be attended to. By this method the bath never gets old, nor acts like an old one, and therefore is never thrown away. It may be used continually, or can be set aside and used after weeks.

The toning is not from gold or anything else than from the silver in the paper and the hyposulphite in the bath, which latter is always *alkaline*, and by this means prevents all sulphurization.

You see by the enclosed that a warm and a colder tone can be produced. I consider these prints as the most durable we can make, and the least liable to fading. Time will show.

The general adoption of my plan I expect to be of great benefit to photography. I intend writing a communication for your Journal on the subject, if you consider it important enough. My object first was to have waited some time yet, so as to collect more evidence on its workings; but the continual appearance of half fading impressions, by the use of old or acid baths, has induced me to come out earlier, so as to preserve photographs from falling into greater discredit than they already have fallen into.

Yours, truly, O. J. W.

N.B. One of the impressions is unmounted, so as to give you a chance to see their looks before mounting and otherwise.

— J. M. Letts. We regret that the specimens of which you speak in your letter did not come to hand. It would have given us pleasure to further your views in regard to them as much as lay in our power. We take the liberty of using a portion of your letter, as it will better explain your views than any thing we can say in the absence of the specimens. Mr. Letts at his last visit to us showed us some very fine specimens of his Atrephographs, so fine were they that we promised to recommend, in our next number, his instruction for taking them, to the photographic public, but not having a mem. of the promise before us when we wrote our editorial, it escaped our memory for which we beg to apologize. The process to which Mr. Letts gives the name Atrephograph, has also been claimed as the invention of our friend Rider, of Cleveland, and he was the *first* to show us specimens of that style of picture taken in America. We have no doubt that both gentlemen must have worked at the process simultaneously, but unknown to them, and that it was, as far as they are concerned, original with each, although undoubtedly the process was practiced some time before in Europe, as may be ascertained by refering to vol. vii. of this Journal. Sometime also before being shown the process of Messrs. Rider and Letts, we were shown two very good specimens taken by Mr. Addoms, an amateur photographer, of this city. This, however, cannot detract from the claims of those gentlemen for originality, as they assure us they had never been acquainted with any similar process previous to their own experiments.

Dundee, Nov. 5, 1856.

H. H. Snelling, Esq.—*Dear Sir* :—Enclosed find a specimen of my new process of making pictures on fine paper, they are destined to fill a vacant space in photography, for they are designed for sending in letters for placing in Albums, on fly leaf of Gift Books, &c. for framing they are far superior to any other kind of photograph, and they need only to be seen to be appreciated. The great difficulty heretofore has been to procure the right kind of papers. I am now making preparations to have it manufactured in quantities, so that I can supply the trade when it will take rank with other branches of the art. Since it has become known through the country, many have claimed to be the inventors of the process, but none of them can say that they took them until long after my pictures were before the public. I have now made another discovery or rather invention, which is this: I flow a glass or any other material, with collodion and sensitize it, and place it away in a dark box to dry; when thoroughly dry they will retain their sensitiveness at least a month (which is as long a time as I have ever kept them), they are then exposed to light in the camera, and developed over a coating box. The pictures are *not* transparent in the shades like the ambrotype, but are fully shaded like the daguerreotype, with all the sharpness and fineness of the daguerreotype which they strangely resemble, without any metallic glare, which is so disagreeable in the plate. The reason of my writing thus is, that if any one has discovered or invented this way of taking portraits, I wish them to come forward and claim it, before I make known my process to the world; after it is known, there will be dozens ready to claim the discovery, and rob me of the credit of it, as they already have done with regard to the Atrephograph Process; so that if any one feels disposed to claim the credit of the invention, they may do so now.

Yours truly,
James M. Letts,
Dundee, Yates Co., N. Y.

— At the late *Michigan State Fair*, Mr. M. Sutton, of Detroit, carried off all the *prizes* for the *best plain and colored* photographs, of all sizes, daguerreotypes and ambrotypes.

— There is no branch connected with the Photographic Art, so difficult to fill as painting in oil and pastel. There is a healthy demand for artists to color photographs, and the present is a good opportunity for young gentlemen artistically inclined to obtain employment. But it is first necessary to know how to do the work well, and in this view we are pleased to learn that Mr. T. Addison Richards, an artist of celebrity and secretary of the American Academy of Design, has opened his *studio* in the University of New York, for the instruction of pupils in the various branches of Fine Art. We have long known Mr. Richards, and can cheerfully recommend him to those desirous of becoming Art-Students.

— Heavy Robbery at Fitzgibbon's Gallery.—Another of those daring burglaries was committed last night, during the storm, at Mr. Fitzgibbon's Daguerrean Gallery, corner of Fourth

and Market Streets. The entrance was effected by false keys, and two show-cases broken open and rifled of their contents, which consisted of gold and silver watches, gold lockets and minature pins, gold chains, ear-rings, breast-pins, rings, silver and plated ware, and fancy articles. One of the young men of the establishment was sleeping in the next room and heard nothiug of it until this morning. The amount of property stolen will not fall short of $1000.

— THE following *Premiums* were awarded at the last *Pennsylvania State Fair* :

To ROBERT MONROE, for the best Ambrotypes, a silver medal.
To A. W. PHIPPS, for the second best Ambrotypes, a diploma.
To R. M. CARGO, for the best Daguerreotypes, a diploma.

— WE find the following additional notice in the *Pittsburgh Dispatch.* The *Dispatch* is, however, mistaken in its assertion, that "the superiority of the Ambrotype over the Daguerreotype, is universally acknowledged." "When *well* taken,"—without "shaking"—they are very beautiful; but in brilliancy, softness and delicacy, they cannot compare with the Daguerreotype.

— MUNROE'S SKY-LIGHT AMBROTYPE GALLERY.—The superiority of the Ambrotype over the Daguerreotype is universally acknowledged, and as the facilities now afforded for obtaining a good picture puts it within the reach of all to procure one, we would call the particular atteution of our readers to the establishment of Mr. R. Munroe, Post Office Buildings, Water street, Allegauy city. The pictures taken by him are in the first style of the art, and one evidence of this is the fact the he obtaiued a silver medal at the recent State Fair for the best Ambrotypes. He devotes his time and attention exclusively to this branch, and has brought it to a perfection equal to any artist in the two cities. His skill and enterprise is deserviug of high commendation, and the patronage of a liberal community is all he asks to compensate him for his trouble. We have frequently noticed that persons, residing in the city, having occasiou to go east on a visit or on busiuess have returned with an Ambrotype, no doubt thinkiug they are far superior than any they could get in this vicinity. This is not the case. We have seen just as good pictures taken in Pittsburg and Allegany city, as in Philadelphia or New York, and after examining some specimen pictures at Munroe's gallery, of persons familiar to us, we unhesitatingly pronouuce them equal to any we have seen anywhere. He pays particular attention to inserting likenesses in lockets, finger rings, &c., and does it in a manner, too, very substantial and durable. His rooms are admirably suited to his buisiness, haviug been built expressly for the purpose. The reception room is furnished in a very neat and comfortable manner, and his sky light and operatiug room is far superior to any in the city. The finishing or work room, on the second floor is a large and convenient one, and is well stocked with everything. Persons calliug at Muuroe's gallery for an Ambrotype, may rest assured that they will not go way unsatisfied, and the advautages of having a good picture of one's self are too apparant for us to make remark on the subject.

THE *Boston Ledger* thus speaks of the new establishment of Messrs. CUTTING & TURNER. Those who are acquainted with these gentlemen, are fully aware how richly they merit what is said of them.

A GREAT ART ESTABLISHMENT.— To all efforts that tends towards elevating, improving, and perfecting ART, we give a cordial greeting and a hearty wish for success. This principle we apply to the so-called fine arts, the arts of industry, or under whatever department they may come. To one and all we welcome them with all our heart. And for the reasou that they add vastly to the pleasures, and utilities, the purposes and the refinements of life. In this conuexion we take the utmost pleasure in bringing to the special notice of our readers and the public generally, the Gallery of Art recently established by Messers. J. A. Cutting and A. A. Turner, No. 10 Tremont row, for the taking of Photographs, Ambrotypes and Daguerreotypes.

Independent of its being one of the most elegant establishments that we have ever visited, we make no hesitation in asserting that it is one of the most extensive and complete iu the whole world—an assertion it may seem to some rather strong, but which the establishment will fully sustaiu us in making, as all who visit if will admit. It contains everything requisite, every convenience and facility that cau be desired or obtained to execute in the most perfect manner either of the aboved-named Arts. We can also assure the public that Messrs. C. & T. are in possessiou of several processes and materials in their art, that no other establishment in the country commands. As a consequence, they are enabled to give a beauty, finish and life to their pictures that we shall in vaiu look for from other artists. In fact their likenesses are next to nature herself.

We are not permitted—nor would it be proper—to detail the particular departments and facilities of the establishment. It is sufficient to state that there are upwards of a dozeu or more apartments, each of which is devoted to some speciality of the arts, and each is superintended by one or more artists of superior skill and attainment. Then Mr. Cutting is himself a professional chemist, and a gentleman of acknowledged and reputable attainments, and the discoverer of the ambrotype process. Mr. Turner is au operator of unequalled skill and taste, and adds to his own acquirement the result of years of studious practice aud experiment, the invaluable opportunities of a resideuce iu Loudon and Paris devoted exclusively aud constantly to the arts in question. To this we may add the important fact that they have under engagement some of the best artists of the Old World. In this excellent mauner, and by these prolific means, together with a building constructed for their especial use, and combining great advantages for light with chemicals, glass and various other materials, artistic, &c., the establishment presents itself, as we hinted at the commencement of this article, as one of, if not *the* best in the world. To such we take the greatest pleasure in directing the attention of all who love art, and especially those who are desirous of procuring likenesses in either of the above processes.—*Bee.*

We fully endorse the above complimentary notice by our neighbor of the *Bee*, and a visit to the rooms of Messrs. Cutting & Turner, will prove conclusively the trnth of every statement —and more too.

— MR. J. ROGERS, of Pittsburgh, and his establishment is thus spoken of by the *Evening Chronicle* :—

"A MODEL DAGUERREAN ESTABLISHMENT.—There are few arts in which greater advancement has been made within a few years than that of which the great Daguerre was the inveutor. First, we had the simple Daguerreotype, and this, when it first appeared, was considered a wouder. And so it was; for instead of setting for hours together for a picture, and then, perhaps, getting a poor one, you had, through the medium of Daguerre's invention, a correct likeness taken in a few seconds, and produced at a price fifty per cent. less than that charged by portrait painters. Next we got the Ambrotype, an improvement on the Daguerreotype, and then came the Photograph, more correct and beautiful than either. This advancement is certainly owing to the genius of our Daguerreotypists, but a good deal depends upon the character of the apartment in which the pictures are taken, and to a good position, light, &c., many a fine likeness is indebted for its excellence.

That Daguerrean artists themselves are aware of this is evident from the great exertions made to procure rooms in high buildings, large skylights, &c. In our own city, great improvements in this line have been made within a few vears, but they are all about to be eclipsed by the splendid rooms of Mr. Rogers, in the new *Chronicle* Building on Fifth street, now almost ready for opening. Mr. Rogers' apartments are in the fourth story, and are fitted up with a taste that does credit to the proprietor. The main room is elegantly finished—the ceiling being tastefully frescoed, &c., and the walls painted in fine style. The smaller apartments, in which the work of "bringing out" the picture will be performed. are supplied with everything pertaining to the business, and are finished in a complete and cozy manner. But the great improvement is the sky-light, which towers high above all the buildings in the vicinity, and presents a surface of, we don't know how many hundred square feet of glass to the sun. It is, altogether, a great affair, and the enterprise which brought it into being, deserves to be commended.

Mr. Rogers will open his rooms in a few days, and as he is an artist of much ability, we presume, with the great facilities which his new skylight affords, that he will turn out pictures equal to the best made in the country.

— FAIR OF THE AMERICAN INSTITUTE.—In speaking of the Daguerreotypes at the late exhibition of this Institute, we stated that those exhibited by Mr. HESLER were the same as

those on exhibition at the 'Worlds Fair.' We were mistaken in part, as he had others there not previously exhibited, but which we did not see in our hasty review.

The following are the awards of the Institute to our Photographic artists:—

J. Gurney, 349 Broadway, for the best photographic portraits (untouched), *Gold Medal.*

J. E. McClees, Philadelphia, Penn., Howard Peal, (agent) 363 Broadway, for the best photographic views; *Silver Medal.*

Henfnagel & Co., 346 Broadway, for the second best photographic views; *Bronze Medal.*

Victor Prevost, 70 Madison Avenue, for the third best photographic views; *Diploma.*

Meade Bros., 233 Broadway, for the fourth best photographic views; *Diploma.*

A. Hesler, Chicago, Ill., for the best photographic water colors and daguerreotypes: *Silver Medal.*

Charles D. Fredericks, 585 Broadway, for the second best photographic water colors; *Bronze Medal.*

J. Gurney, 349 Broadway, for the third best photographic water colors; *Diploma.*

J. Gurney, 349 Broadway, for the best photographic oil colors, life size. (A gold medal having been before awarded); *Diploma.*

Charles D. Fredericks, 585 Broadway, for the second best photographic oil colors; *Silver Medal.*

J. Gurney, 349 Broadway, for the best photographic pastel colors; *Bronze Medal.*

Charles D. Fredericks, 585 Broadway, for the second best photographic pastel color; *Diploma.*

William A. Tomlinson, 447 Broadway, for the best ambrotypes. (A silver medal having been before awarded); *Diploma.*

Meade Bros., 233 Broadway, for photographs on stained glass and silk; *Silver Medal.*

Charles Ketchum, Pen Yan, N. Y., for the best daguerreotype cleaning machine; *Diploma.*

Peter Neff, Jr., Cincinnati, Ohio, E. Anthony, 308 Broadway, for the best melainotypes; *Bronze Medal.*

C. C. Harrison, cor. Elm and White Streets, for Daguerreotype instruments. (A silver medal having been before awarded); *Diploma.*

Ensliu, Schkeiber & Co., 3 Maiden Lane, for Daguerreotype plates; *Diploma.*

John Griesler, 75 Mott Street, for a case of cameras; *Bronze Medal.*

William Lloyd, 522 Broadway, for two stereoscopic cosmoramas; *Diploma.*

William Lloyd, 522 Broadway, for patent improved stereoscopes; *Diploma.*

— Kellogg's Patent Plate Holder. Our friend Whitney, of Rochester, has shown us the model of a capital invention bearing the above name. We should judge from seeing it, and the explanation given for its use, that it is a most excellent labor and money saving piece of apparatus. The facility with which it can be used, the time saved by its use, and the small quantity of solution required in coating plates must recommend it, especially to those who take large pictures. It is so arranged that the operator can coat his plate and go through all his manipulations to complete a picture without removing the plate or canvas from it, thus dispensing with the large and expensive silver bath, developing dish, &c., one ounce of nitrate of silver solution being sufficient for a dozen life size heads. These, certainly, are reasons enough for its general adoption. County or gallery rights can be secured by addressing Mr. D. J. Kellogg, Rochester, N. Y.

— "Tatum's Patent Oil Ground" for Photographs.—In our October Number, we referred to this new improvement in the application of the Photographic Art, and we find that many of the profession do not fully comprehend the nature of the new discovery. Many suppose that it is a new application of an old process, christened with a new name, and the word "Patent" added to it, to give it more significance. But this is far from the fact. The discovery is indeed quite new, and the Patent is pronounced perfectly valid, being an entirely new and distinct application, of a chemical process, by which means an oil ground surface like a canvas prepared for the pencil of the artist, is rendered of such a nature as will admit the use of various chemical substances in the production of the photographic impression. For it is a well-known fact, that none of the photographic chemicals can be used, except in the form of solutions combined with water. It is evident, therefore, that the oily nature of the canvas would not allow the solutions to cover it, unless there was some radical change previously made upon its surface.

This is effectively accomplished by the discovery, and herein consists its great merit and the claim to a patent. Indeed on this alone is based the claim to a patent, together with the restoration to its original oily nature.

Photographic impressions have been made upon canvas before the application of this Patent. But all these required some intervening substance, of a nature to resist oil among which albumen was used and even collodion; some operators have taken ambrotype or positive impressions directly upon the canvas. Yet all these have been found totally impracticable, from the fact that after the oil is laid on, the pictures will invariably crack off, rendering them useless.

Another plan has also been adopted with indifferent success, viz. the preparation of the canvas with some substance that does not contain an oily nature, and then printing upon its surface. This has many objections, because only one kind of canvas can be used, and that is also very liable to crack off, while the oily nature is deemed indispensible to a good canvas picture.

Tatum's Oil Ground Photographs are placed on the canvas in such a manner, that when the picture is finished, it becomes as much a part of the canvas itself as though no photograph were employed for the outline. Not so with all other pictures on canvas. They are separated and distinct from the canvas, and consequently they do not possess the durability claimed for those by Tatum's Process.

This whole operation is very simple, and consists of first removing the the oily nature from the canvas, and then of applying the salt and silver precisely as in the process of printing a paper, with an ordinary negative. Then after the picture is placed on the canvas and thoroughly fixed, the oily nature is perfectly restored, and it is in precisely the same state as when it came from the Artist's color depot. The restoration of the canvas is also a portion of the claim of the Patentee, for without that the invention would be incomplete.

It is only necessary, therefore, for any Photographic Artist to have the process explained to him—to freely comprehend and practise it, and it requires only a negative on glass, the size of the picture required upon the canvas, to produce the effect sought. The whole is very simple, and does not involve any additional outlay of chemicals more than is possessed by any photographer, except the nitrate bath and the camera box for enlarging up to the size desired. A bath capable of admitting a glass 14x17 inches, will be sufficiently large for life-size, and a camera box of cheap material, having a plate holder large enough to receive the glass plate is all that is necessary. No large dishes are required, no additional camera tubes, as a quarter or half size will answer for most purposes.

The utility of this invention has never been questioned, and it has commended the approval of all the distinguished artists of this city, who have witnessed the specimens of this new discovery. Many indeed have availed themselves of its usefulness, and purchased impressions of their sitters, made by this process, and we are confident many others will also, as soon as its nature is more generally known and practiced.

— This *is the last number of the* Photographic & Fine Art Journal *that will be sent to those who are in arrears in their subscription, unless they pay up before our next issue.* As we wish to make a better start with the first number of Vol. X. than we did with Vol. IX., we trust our subscribers will *promptly meet* our terms. We shall publish the list of payments.